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A DIGEST  
OF THE  
PRINCIPLES AND PRACTICE  
OF MEDICINE,

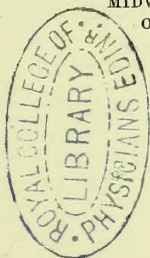
WITH

A SHORT ACCOUNT OF THE HISTORY OF MEDICINE,  
AND TABLES OF INDIAN MATERIA MEDICA.

BY

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THE

# PROCEEDINGS AND REPORTS OF THE COMMISSIONERS OF THE LAND OFFICE

FOR THE YEAR 1881

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TO  
JAMES RISDON BENNETT, LL.D., M.D., F.R.S.,

PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON,

AND TO

SIR JOSEPH FAYRER, K.C.S.I., LL.D., M.D., F.R.S.,

HONORARY PHYSICIAN TO THE QUEEN AND H.R.H. THE PRINCE OF WALES;  
PRESIDENT OF MEDICAL BOARD AT INDIA OFFICE.

GENTLEMEN,

It was the course of study indicated by the examinations of the Royal College of Physicians which first led me to arrange my knowledge in writing, and I, therefore, feel that I owe the pleasure and advantage which the preparation of this work has given me, as well as any reputation I may hope to obtain from it in future, to the college over which Dr. BENNETT presides, and to the membership of which I was admitted by him.

To Sir JOSEPH FAYRER I feel that I owe, besides a share of the regard which all medical men in India feel for him, a special debt of gratitude for numerous acts of kindness to me while in London.

Therefore, gentlemen, it is to you

I Dedicate this Book,

And I have the honour to be

Your most obedient servant,

RUSTOMJEE NASERWANJEE KHORY.

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## PREFACE.

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THIS book is offered to the medical practitioner and the medical student in the hope that it may be of use to the one for ready reference, and to the other as a convenient means of revising his studies. I have therefore thought it advisable to avoid all attempts at style or elaborate detail, which, in a work intended for the general reader, would unnecessarily augment the bulk of such a volume as this without materially adding to its usefulness to the class of readers for whom it is designed.

As will be seen at once, I have drawn largely upon known medical authorities, to whom, once and for all, I acknowledge my deep indebtedness. A work like this is essentially an embodiment in a convenient form of the contents of standard medical writers, and of the hypotheses and facts which modern research has given to the world.

The book begins with an account of symptoms in general, or a description of the chief observations which indicate the existence and nature of disease. These are classified according to the parts of the organism in which they are manifested. Thus, all the symptoms manifested by the respiratory tract are taken together, whether indicating disease of that region or associated with disease of other organs. The principles upon which a diagnosis is made are next discussed, and I have followed Susruta in making prognosis the subject of a separate division. The main principles of treatment complete this general view of the subject.

The account of the various diseases follows, and occupies the greater part of the book. Each disease is first defined. Its causes, pathology, morbid anatomy, symptoms, diagnosis, prognosis, and treatment are described *seriatim*. This, with a slight modification, is the order of the mediæval writers on medicine.

“Serapyon, Rhazes, and Avycen,  
Averrois, Damascien, and Constantyn,  
Bernard, and Gatesden, and Gilbertyn.”

Their pages are seldom turned over now, their method was not favorable to the discovery of scientific facts, but they lived in an age in which scholasticism had brought formula to the highest perfection, and I hope that the uniform order which I have adopted from them may prove as useful to the modern student as it doubtless was to the subtle disputants of Salernum and of Montpellier.

In other respects I have in the main followed the beaten track, except that I have more often than is usual resorted to tables for the purpose of clear exposition of resemblances, differences, and details, and that I have introduced a short account of insanity under diseases of the brain, and a short abstract of toxicology among diseases of the stomach. Hippocrates has a treatise on ancient medicine, and I have felt that a short account of the growth of the observations and hypotheses which my book contains was the most fitting conclusion to it, and I have accordingly printed a letter which a Fellow of the College had written to me on the subject. Modern investigations have, it is true, shown that our Susruta is no native Indian, but Hippocrates himself, and that the Eastern learning, as regards medicine, is a reflection of the scientific brilliancy which so early appeared in the West.

If, however, India cannot claim the origin of medicine, her



practitioners have, at least in modern times, discovered and brought into scientific use numerous valuable remedies. Of these I have given a series of tables and prescriptions. Of the efficacy of a large number of these drugs I have made numerous trials, and obtained satisfactory proofs.

Dr. Burjorji, Physician to H.H. the Maharaja of Bhownuggur, has been so good as to assist in this part by sending several native prescriptions which, with others of my own or of general use, are appended to the table of bazaar drugs.

I have been indebted to Dr. Birdwood's catalogue of "The Economic Products of the Presidency of Bombay" in preparing this list.

I have prepared myself for the work by an extended course of reading, and by observation of the methods of medicine in several parts of India as well as in the hospitals of London, Brussels, and Paris. If my book proves useful to even a few of my professional brethren, whether practitioners or students, I shall have received a sufficient reward for my reading and my travels.

In conclusion, I beg to convey my sincerest thanks to the teachers of St. Bartholomew's Hospital in general, and especially to Dr. Andrew, Dr. Gee, and Dr. Moore, for opportunities of observation, or for suggestions during the progress of the work.

RUSTOMJEE NASERWANJEE KHORY.

*5th March, 1879.*

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# MEDICINE.

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THE preservation of health and the cure of disease are the objects of Medicine. The study of symptoms and of the action of drugs, with pathology, which is the physiology of the morbid action of organs and morbid anatomy which tells of the appearances found after death as a result of pathological changes, make up the science or rather the extended circle of sciences included under the general term Medicine. It is obvious that no scientific boundary separates medicine from surgery or from gynæcology, but for the study of disease these divisions are convenient, and I have adopted them, so that for the purposes of this book medicine may be taken as synonymous with the practice of a modern physician. I have therefore left the student or the practitioner to refer to works on surgery or gynæcology for all diseases requiring operation or a peculiar training, only alluding to them where their insertion is essential to a complete description of the medical aspects of disease.

In the arrangement of diseases I have chosen to adopt convenient and well-known hypotheses without discussing their absolute truth. For example, I have used the term "diseases in the blood" merely because it associates a series of maladies in which there is an obvious common

factor, although, of course, the precise nature of that factor is as yet only hypothetical.

Disease—  
Organic.      Disease may be—1. *Organic*, attended with change  
Functional.    of structure in the part affected. 2. *Functional*, when no  
such change exists, although disorder is observable.

In the blood.      Disease may be in progress—1. *In the blood*. It may mani-  
fest itself as a *blood derangement*. The chief forms are—*a*.  
Blood de-  
rangement—  
Anæmia.      *Anæmia*, mere poverty of blood. Its characteristic is pallor.  
Plethora.      *b*. *Plethora*, the converse of anæmia. In it the face is  
red, the blood is rich in its chief constituents. The  
patient is subject to acute inflammations and hæmorrhages.  
Chlorosis.      *c*. *Chlorosis*, a peculiar anæmia, occurs in young females,  
and has a characteristic complexion. *d*. *Leukæmia*, a  
Leukæmia.    condition of blood in which the number of red corpus-  
cles is diminished and the number of white absolutely and  
relatively increased.

Blood-  
poisons—  
Zymotic  
diseases.      *Blood poison*.—Blood poisons may manifest them-  
selves as—*a*. *Zymotic diseases*. These are due to the  
introduction into the blood of definite morbid agents. *b*.  
Pyæmia.      *Pyæmia* is also due to the absorption of a morbid agent, but  
differs from a zymotic disease in that the poison is carried  
through the system from some unhealthy part of the body  
and does not come from the external world. *c*. *Uræmia*  
Uræmia.      is a rapid poisoning due to cessation of the functions of  
the kidneys.

In the  
organ—  
Hypertrophy.  
Atrophy.  
Inflamma-  
tions.  
Degenera-  
tions.  
Morbid  
growths.      2. *In one or in all the tissues of an organ*. Any altera-  
tion in the normal condition may lead to changes known  
as hypertrophy, atrophy, inflammations, degenerations, and  
morbid growths.

## ETIOLOGY.

Causes.      *Etiology* treats of the causes of diseases.

Division into  
Proximate or  
pathological.      The cause may be *proximate* or *remote*. The *proximate*  
cause of disease is the morbid condition of any organ  
or structure upon which the symptoms depend. The

*remote* cause is one which can be traced to conditions external to the body. The remote causes may be—*pre-disposing* or *exciting*. *Predisposing* are those conditions which already exist in the body, and which thus render the system generally, or any one part of it, especially susceptible to disease. *Exciting* causes are those circumstances which are wholly external to the body.

Remote  
Another  
division—  
  
Predisposing  
  
Exciting.  
  
Predisposing  
Age.

The chief *predisposing* causes are—*Age*. Some diseases, as smallpox, may occur in the fœtus, and at any period of life to extreme old age. Others are confined to a particular epoch, while a larger number have a limited range through more than one period. A few examples may be given. Endocarditis of the right side rarely occurs but in the fœtus. The new-born child has a peculiar tetanus and a peculiar œdema. Rickets begins during lactation, eclampsia nutans during the same period. Croup and whooping-cough are disorders of the period of the first dentition. Chorea rarely occurs after puberty. The whole range of cancerous disorders are most common at the end of the middle period of life. Emphysema, angina pectoris, granular kidney, apoplexy, all belong to the same era. General paralysis is very rare much before thirty or much after forty. Prurigo and idiopathic gangrene are diseases of the last period of life. Examples of diseases of wide but not absolutely of indefinite range are—Gout, which may begin immediately after puberty, though never before it, and which extends to the last years of life: Rheumatism, which occurs in children just able to walk, and thence onwards, and tubercle, which is most common from thirty to forty, but which may occur in the second year or at any other.

*Sex*.—Besides the diseases of or relating to the sexual organs, statistics show that one sex is more likely to have some diseases than the other. Croup and gout are common in males, ulcer of the stomach and exophthalmic goître in females.

Sex.



*Constitution.*     *Constitution of the patient.*—Many conditions predispose to diseases. Thus anæmia, whether congenital or acquired; plethora, as due to high living; a long neglected symptom, as cough; previous suffering from any acute disease; an habitual neglect of certain natural functions; the sudden suppression of an habitual discharge; the pre-existence of structural changes in any organ or tissue; any exhausting discharges, as hæmorrhages, fluxes; all these conditions tend to render the body readily susceptible of various diseases.

*Idiosyncrasy.*     *Idiosyncrasy of the patient.*—With certain individuals certain articles of diet or certain medicines act in an unusual manner. Thus, quinine salivates a few, and in some persons opium acts as a strong purgative.

*Heredity.*     *Heredity.*—Abnormal structures are the most obvious instances of hereditary transmission, and a tendency to morbid growth dependent upon some less obvious but radical abnormality is the probable explanation of the distinct heredity of certain diseases. The vitiated growth may not always give rise to precisely the same result. Thus the children of a lunatic may be lunatic, epileptic, or phthisical. The offspring of persons with goître are cretins without goître, or the same disease may descend directly to some of the offspring of each sex or to the offspring of one sex only, and in this case the latent tendency may be transmitted to the affectable sex in a next generation. Thus, gout is transmitted as gout, but chiefly to male offspring. Hæmophilia is also inherited almost exclusively by males, though capable of transmission through unaffected females. That which is hereditary is strictly what is acquired in the process of fertilization of the ovum. That which is congenital is acquired during growth of the foetus. Thus, a mother may infect her offspring before birth with smallpox, and the child may be born with the disease; which is then properly described as con-

genital, and must be distinguished from what is hereditary.

*Intermarriages.*—Marriages among near relations, by intensifying inherited morbid tendencies and by preventing their eradication by healthy crosses, no doubt perpetuate hereditary diseases. The custom of marrying at an immature age, so prevalent in India, has, I am sure, a powerful influence for evil on the constitution, and tends to, develop morbid conditions, which soon become hereditary, and might no doubt be carried so far as to cause the deterioration of the race. Inter-marriages.

*Race.*—In most cases it is difficult to distinguish the influence of race from simple heredity. But the liability to contract particular disorders and to die of them is much greater in some races than in others. Thus, the recent epidemic in Figi showed that the constitution of the South Sea islanders was far less capable of resisting the effects of the poison of measles than is that of Europeans. Race.

*Locality.*—Besides the obvious results due to a sheltered or an exposed region, of a place where the changes are sudden, or one where the temperatures are equable, particular conditions are undoubtedly to be found in particular localities. Hydatid of the liver and paroxysmal hæmaturia are much commoner in Iceland and Mauritius respectively than anywhere else. Stone in the bladder is common in Guzerat and in Norfolk, while it only occurs occasionally elsewhere. Locality.

*Exciting causes are, Food.*—Unwholesome food, too uniform a diet, excess, too little food, irregular hours of meals, or insufficient mastication, are frequent origins of disease. Milk is said to contain all the aliments necessary to maintain human life in its most perfect state. It contains nitrogenous matters, as casein, albumen, &c.; carbonaceous, as fat, oil, and sugar, in the form of lactic acid; and Exciting causes.  
Food.

water and salts. In any given diet there ought to be foods of each group, in order to maintain perfect nutrition. Thus, we take *nitrogenous* elements in flesh; in vegetables fibrin; albumen in various forms, as white of eggs, *gelatin*, &c.; *carbons*, as in animal and vegetable fats; *starchy* and *saccharine* substances; and *salts* and *water*. Besides those substances which are absolutely necessary for the maintenance of health there are others which enter into many diets, such as the various condiments which give taste to food or excite secretion, and flavoured drinks, such as tea and coffee.

Its quantity.

The quantity of food requisite for healthy men of average height in India, between 5 ft. 3 in. and 5 ft. 6 in. and average weight, between  $4\frac{1}{2}$  and  $5\frac{1}{2}$  maunds, in moderate work, is estimated at about twenty ounces of water-free food, or about thirty-five ounces of ordinary food, as the latter always contains about 60 per cent. of water. With this quantity of food about sixty ounces of water is also taken daily in some liquid form. The amount of food varies with each individual, with differences of exertion, and with differences of climate. Those in laborious work take more food than men in quietude and those in cold seasons, and in cold countries more than in hot.

Excess of food.

*Excess of food.*—When taken in excess food is not absorbed; it undergoes putrefactive changes in the alimentary canal and quantities of gas are formed. Dyspepsia and diarrhœa are thus produced. In cases where the putrid matters are absorbed it gives rise to fever, torpor, and congestion of the liver. Each kind of food can only be advantageously digested or even digested at all to a certain amount varying with the kind. Thus more meat may be usefully digested than starch and more starch than fat. Fat when taken in large quantities passes unchanged through the bowels. When excess of food, par-

ticularly of animal food is taken continuously, a general state of plethora is induced. If exercise be not taken at the same time there is imperfect oxidation of food and therefore retention of constituents unchanged, giving rise to irritation of the skin or of the kidneys. Excess of albuminates without other food leads to fever and diarrhœa, and if persevered in, albumen appears in the urine. Excess of starches and of fats delays metamorphosis of the tissues and produces excess of fat. Sometimes it produces acidity and flatulence. When taken in excess much passes into the fæces and the urine may become saccharine.

*Deficiency of food.*—The effects produced by famine in India are too well known. Deprivation of albuminates, without lessening of other kinds of food produces deleterious effects after some time. Starch can be borne longer if fat be given, but if both are excluded illness is sure to result in a short time. Fat is essential, and many diseases of malnutrition are successfully treated by fat alone, which shows that deprivation of it is more serious than is commonly supposed.

Deficiency of food.

*Beverages and Condiments.* — Beverages: alcoholic drinks when taken in small quantities improve appetite and increase the activity of the circulation. In disease their effects on the brain and general system are well known. When taken in large quantity they affect the nervous system generally, impair appetite, lessen muscular strength, and promote degenerations. The average quantity that can be taken in twenty-four hours with impunity may be estimated to be between half to one ounce of pure alcohol imbibed in some diluted form. In women a less quantity will suffice. In children it is badly borne, and highly injurious. It has no doubt been statistically proved that intemperance has caused a vast loss of health and life. At the present day

Beverages



total abstainers and those who use alcohol moderately are known to enjoy the highest health, longest life, and greatest vigour of mind and body. Although man can do without it in health, there are morbid conditions in which it is most useful, and instances can no doubt be found in which large quantities have been taken throughout very long lives. Lord Eldon, who was Lord Chancellor of England for a quarter of a century, is known to have taken three bottles of port a day. In great cold and in great heat alcohol is absolutely injurious. It is forbidden on Arctic sledge parties. The common notion that alcohol is necessary in India and in the tropics is a mischievous delusion, and more cases of dysentery and liver complaints among the Europeans occur from this than from any other cause. Waterton, the famous traveller in the tropical regions of South America, never touched alcohol, and he died of an accident when eighty-three. General Peronnet Thompson, who served in the Peninsula and on the Persian Gulf, and was Governor of Sierra Leone for the full term, and afterwards sat in several Parliaments, and lived to the age of eighty-six, is another example of entire abstinence from alcohol, associated with excellent health and life in the tropics, without injury to the constitution.

In cases of great exhaustion of the nervous system alcohol revives the mind greatly by augmenting the circulation in the brain. The nervous tissue thus receives more nutriment, and therefore must work more strongly for the time. In cases where there is want of food alcohol has a sustaining force, and is said to act by keeping up the action of the heart and deadening the susceptibility of nerves. Of all beverages beer, when taken in moderation, is well adapted to aid digestion and to lessen elimination of fat; it thus increases the weight of the body by promoting assimilation and lessening metamorphosis.

Thus, alcohol when taken in excess or at frequent intervals, either strong or only diluted slightly with water, or on an empty stomach, or as an adulterated stuff, always does harm. Even pure water when taken in too large a quantity and during meals proves injurious. Experiments have proved that water is often the means of conveying the poison and other substances into the system; thus the poisons of noxious gases, metals, ova of worms, and even specific poisons, are conveyed through this agent.

*Condiments.*—The food of many poor Hindoos, and especially of the working classes, chiefly consists of Bajri or Joovar bread and Chutney, made of chillies mixed with various spices. The result of such diet has been that they generally begin to get weak-sighted at an early age. Those of the middle classes who use spices too largely with their food frequently suffer from dysentery and from violent straining, with burning pain in the rectum. These condiments may be supposed to have a *local irritant* action on the mucous membrane of the large intestine. In a few cases they affect the urinary tract and strangury results. In India such condiments as chillies, cayenne pepper, and pickles, are best borne by people living in cold climates. In India such condiments are an essential and useful part of the diet of the mountaineers. From the hills their use has descended to the inhabitants of the hotter plains who only need them as an occasional luxury, and are injured by their extensive consumption.

Condiments.

*Habits.*—Individuals who habitually smoke tobacco, opium, bhang, ganga, or chew tobacco very frequently, or every day use very hot condiments along with their food, often suffer from diseases.

Habits.

*Insufficiency of clothing.*—It is a fertile source of many chest diseases. Persons who are insufficiently clad, and who expose their skin to the draughts of cold air, and those who allow their clothes to remain over the skin in

Insufficient clothing.

a wet state for a long time, suffer from diseases of the lungs.

Exercise.

*Exercise.*—Any undue exercise of either the body or the mind, great mental anxiety, disturbed sleep, any violent emotions, and the neglect of physical exercise, all tend to produce nervous diseases.

Mechanical  
irritation.

*Mechanical irritation.*—As a result of intestinal worms, calculi in the bladder, retained fæces; any foreign or irritating substances in the air passages as particles of dust, cotton, iron, &c., favour the development of diseases.

Contaminated  
atmosphere.

*Contaminated atmosphere.*—Individuals who breathe air contaminated with foul gases, or mixed with cotton or wool dust, or with carbon or fragments of metals, as iron, lead, arsenic, &c., thus become subject to diseases.

Temperature.

*Temperature.*—Continued exposure to a very high temperature, and especially when the body is fatigued, leads to fevers and to diseases of the brain and lungs, and in extreme cases even to death. Exposure of the whole body or of any of its parts to intense cold affects the general system, or produce serious local maladies.

Venery.

*Venery.*—Those who indulge in venereal excesses, masturbation, in too frequent and too early passions, suffer from many nervous diseases.

Soil.

*Soil* :—Consists of animal, vegetable, and mineral matters, mixed with air and water. The loose porous soils are healthy because they are dry and are not impregnated with noxious effluvia from animal or vegetable putrefaction. Damp soil produces misty air, thus aiding the evolution of unhealthy vapours, whence arise diseases, as catarrh, rheumatism, and neuralgias. A moist soil also influences the development of malarious fevers, cholera, and dysentery. The rise and fall of river waters in India, by making the soil too moist or too dry, often cause periodical outbreaks of malaria. When an outflow is impeded the result is a universal prevalence

of fevers. Thus, by attention to drainage operations, malarious places have been rendered quite healthy. Typhoid fever has been supposed to be connected with changes in moisture of the soil, and it was observed that when the ground water was lowest the fever rapidly spread. For malarious fevers it is pretty nearly ascertained that there is apparently some kind of decomposition or fermentation going on in the soil, which contains organic matters, and that this is aided by heat, moisture, and limited access of air. Marshy soils, except those which are regularly overflowed by water, cause periodic fevers. Such soils contain a large percentage of water, a large amount of organic matter, and abundant vegetation, and their surface is flat with a slight drainage. Muddy soils in the vicinity of large streams, if occasionally covered with water, are highly malarious. The soils of valleys and nullahs, by containing large quantities of vegetable matters owing to the narrow outlets of the valley, impede the overflow of rains, and are also malarious. The deleterious gases which result from the decomposition of vegetable matters in the sewers, when mixed with the air we breathe or the water we drink, become a source of many diseases.

## SYMPTOMATOLOGY.

Symptomatology or semiology includes *symptom* and *signs* of diseases. A *symptom* has reference to the patient's own description of his feelings and sensations in a given case. A *sign* refers to the knowledge we gather by our own senses.

The symptoms and signs are classified into :—

		Divisions.
<i>General</i> or <i>local</i> . General, as they refer to the whole system ; or local, only to a particular part. <i>Subjective</i> or <i>objective</i> . Subjective, as evident to the senses of the observer ; objective, as only felt by the patient. <i>Direct</i>		General or local.
		Subjective or objective.
		Direct or sympathetic.



or *sympathetic*. Direct, when it points directly to the diseased part; *sympathetic*, when to some part remote from the seat of disease. *Premonitory*, when they present themselves before the development of a disease and indicate what is to happen. *Pathognomonic*. These are characteristic symptoms which assist in establishing the diagnosis of a particular disease.

Premonitory.

Pathogno-  
monic.Physical  
signs.

*Physical signs* are those conditions which are evident to the senses of the observer, and elicited only by an examination of the body.

Summary.

In order to facilitate the study of symptoms and physical signs a short summary of them has been arranged in the following pages.

### SYMPTOMS CONNECTED WITH THE NERVOUS SYSTEM.

Symptoms—  
Nervous  
system.  
Subjective.

These are (1) *subjective* and (2) *objective*.

1. Subjective are *intrinsic* and *extrinsic*.

The *intrinsic* are—*a*. Abnormal sensations in the head.  
*b*. Those connected with the spine. *c*. Mental disturbance.  
*d*. Derangement of the special senses. *e*. Alterations affecting sensation and motion. *f*. Changes in nutrition, secretion and supply of blood to the different parts of the brain.

The *extrinsic* symptoms are referable to the derangement of stomach, bladder, bowels, and sexual organs.

Objective.

2. *Objective*.—These are—*a*. Physical examination of the head and the spinal column. *b*. Tests for cutaneous sensibility. *c*. Tests for muscular movements and muscular irritability.

Subjective  
symptoms—  
Intrinsic.  
Sensations in  
the head.

*Subjective symptoms: intrinsic—*

*Abnormal sensations in the head* include headache, giddiness, dizziness, heaviness, throbbing, and heat.

In the spine.

*Sensations in the spine*: pain or tenderness on pressure over the spines of the vertebræ; sense of tight-

ness over the chest walls, which are described as feeling as encircled by a tight band. The pain may be localised to a part or spread all along the spine. It may be paroxysmal or constant—may arise on the application of cold or heat.

*Mental disturbance* includes impairment of thought, judgment, memory, reasoning, and perception, various kinds of delirium, delusions, illusions, and hallucinations; alterations in spirits, temper, and disposition. Disturbed sleep is another variety of mental disturbance. Mental disturbance.

*Derangement of special senses.*

*a.* Vision may be altered; may be defective, double vision (diplopia); complete blindness (amaurosis); there may be flashes of light or muscæ volitantes or scotomia. *b.* Hearing defective (tinnitus aurium). *c.* Smell or taste perverted. Disturbance of special senses.

*Alterations affecting sensations.*—The sensibility may be increased (hyperæsthesia), diminished (anæsthesia); perverted (dysæsthesia). These alterations are known as numbness, pricking, tickling, formication, aura epileptica, &c. Disordered sensations.

*Alterations affecting motions.*—Motion may be increased, as in general restlessness; changes affecting attitudes while lying, sitting or standing; tremulousness, muscular spasms; cramps; convulsions; rolling of eyeballs (nystagmus); trismus, &c. May be diminished (paresis), or completely lost (paralysis). There may be loss of power of co-ordination, as in locomotor ataxy, or movements may be automatic and involuntary: choræic movements. Disordered motions.

*Disordered functions.*—Alterations in nutrition, secretion, and supply of blood, leading to wasting, atrophy, and coldness of the paralysed part. Deranged functions.

*Subjective symptoms. Extrinsic.*—These refer to paralysis, to derangement of the stomach and bowels, as nausea, vomiting, obstinate constipation, &c.; involuntary passage Extrinsic.

of urine and fæces ; retention or incontinence of urine ; excitement or abatement of sexual powers.

Objective  
symptoms.

*Objective symptoms.*—These are ascertained by several methods of physical examination : of the *head*, as to size, shape, state of fontanelles, and tumours ; of the *spine*, as to shape and tumours ; of the *sensibility* of the *skin*, by touch, pressure, pricking, pinching and electricity ; of the *muscles*, as regards their movements and irritability, by putting the muscles into different actions, by testing their grasping and co-ordinating power, and by tickling the soles of the feet to excite reflex actions. An important point is the action of the muscle on application of the constant and of the interrupted current, whether it contracts more or less completely than in the normal state, or than in a former state, or whether it contracts at all.

Symptoms.

*Symptoms—cerebral and spinal.*

*Cerebral*, which includes headache, neuralgia, giddiness, insensibility, stupor, coma, delirium, sleep, dreams, somnambulism, and nightmares.

*Spinal*—derangement of motion and sensation.

Cerebral.

*Cerebral symptoms* are found in pneumonia, intussusception of the bowels, diarrhœa, cholera, laryngismus stridulus mumps, in eruptive fevers, and diseases of the brain and its membranes. They are also caused by worms.

Headache.

I. HEADACHE (*cephalgia*) is common in acute and chronic brain diseases ; in injury to or diseases of the bones of the cranium ; in all those circumstances which interfere with cerebral circulation, as congestion, deficient or deranged circulation of blood ; in neuralgia ; in deranged or diseased conditions of blood, as plethora or anæmia ; in fevers, gout, rheumatism ; or it may arise from sedentary habits, or from various excesses.

Divisions—  
Organic.

*Division.*—*Organic* or congestive is due to diseases of the brain and its membranes, accompanied by giddiness, vomiting ; the pain is sharp, lancinating, or throbbing, increased

on noise or warmth, and lessened by elevating the head. *Plethoric*, due to congestion of cerebral vessels. There is pulsation and ringing in ears, and giddiness on stooping. Sudden suppression of habitual discharge thus causes headache. *Bilious* may be temporary or constant. It is generally severe in the morning after restless nights; and is due to errors in diet, and passes off with the cause. It may be constant in persons with weak stomach and gout. *Nervous*, due to debility, exhaustion, poor blood, as in renal diseases, hæmorrhages, decayed tooth.

Plethoric.

Bilious.

Nervous.

*Varieties.*—*Hemicrania* or brow ague, confined to half the head. *Megrim*s, common in nervous women exhausted by over-lactation. *Clavus hystericus*, in hysteric women, is confined to a single spot, and is compared to the pain of a nail being driven into the part. *Nervous* or neuralgic is very often periodic and not increased by pressure, nor by movement; is only on one side, often extends to the face; the scalp is sensitive. *Rheumatic* affects the scalp. Besides headache, there is vomiting and paralysis of some of the special nerves; it is increased by movement and by pressure, and the muscles which move the head from side to side are stiff. *Syphilitic* affects the periosteum of the scalp; is generally limited to one spot; not increased by movement but only increased by firm pressure.

Varieties.  
Hemicrania.

Megrim.

Clavus  
hystericus.

Nervous.

Rheumatic.

Syphilitic.

Headache is common in *hydrocephalus*. In acute cases, children shriek and wake out of sleep from pain in the head. In *anæmia* there is a fixed pain in the eyebrow or on the top of the head. Narcotics or alcohol cause general headache. In *fevers*, remittent, typhoid, &c., there is heat of the head with throbbing and pulsation of the temples. In *chronic brain diseases* and *uterine affections* pain or aching is felt on the top of the head; it is generally periodic, limited to one spot, constant, and also attended with functional disorders of the brain.

Headache in.



Neuralgia.

II. NEURALGIA. signifies nerve suffering. It may attack any sensory nerve. If is a violent pain in the trunk and branch of a nerve, occurring in paroxysms, often at equal intervals, and is often referred to parts which have ordinarily no sensibility, as the heart. The pain is acute, shooting or darting, with tenderness of the part upon pressure, but no heat, no throbbing, no swelling of the blood-vessels.

Varieties.—  
Facial.

*Varieties.*—*Facial neuralgia* affects either of three branches of the fifth nerve. When first or ophthalmic branch is affected (supra orbital), the pain is referred to forehead. When second or superior maxillary branch (infra-orbital) there is excruciating pain, shooting over cheek, lower eyelids, alæ nasi, and upper lip. When third or inferior maxillary (infra-dental) pain is referred to the lower lip, alveolar process, teeth, chin, and side of the tongue.

Hemicrania.

*Hemicrania* affects one side of brow and forehead, often accompanied with sickness, sometimes periodical, and continues as long as the sun is above horizon.

Sciatica.

*Sciatica* affects great sciatic nerve, extends from sciatic notch down to back of thigh, popliteal space, along nerves of leg to foot.

Neuralgia  
dentales.

*Neuralgia dentales* (pain in the teeth) is common in early months of pregnancy, in disordered health.

Mastodynia.

*Mastodynia* (neuralgia of the breast).—The breast in females may be painful without any structural disease of gland. The pain is often periodic and liable to exacerbations and the breast somewhat hot and swollen. It is often due to uterine or ovarian irritation. In some the breasts are irritable at every menstrual period.

Intercostal.

*Intercostal*:—Common in hysteric women, also in chlorosis; affects intercostal nerves, occurs in Bright's disease, phthisis, &c. The pain is of a dull aching character, sometimes lasts for weeks. Generally seated in

sixth, seventh, eighth, or ninth nerve of the left side. Follows the course of nerves from front of chest to spine behind. Pressure sometimes detects one or two painful spots, but there is no fever. Such pain sometimes precedes an attack of herpes zoster.

*Gastrodynia* (cramp in the stomach) is common in Gastrodynia. dyspeptics, and is sometimes an indication of cancer or of simple ulcer of the stomach. It occasionally comes on suddenly as a result of exhaustion produced by prolonged speaking. Of this an example may be mentioned which every one who has read the history of India will recollect. Burke was thus seized towards the end of his great speech on the second day of the trial of Warren Hastings.

*Pleurodynia and lumbago*.—The dorsal and intercostal Pleurodynia. nerves are the seat of pain, which is continuous in character, and increased by exertion. The mere act of straightening the back in lumbago often causes great agony.

*Angina pectoris*, a severe, sudden pain in the breast, is Angina pectoris. attended with a strangling sensation and anxiety. It commences in the pneumogastric nerve, and spreads in different directions.

III. *Vertigo (giddiness)* is a sensation of turning or Giddiness. whirling round or falling. To the patient surrounding objects are in a state of motion, he loses his balance for a time, grasps at some firm support, often recovers without falling down, and then sits down suddenly. Sometimes he staggers without feeling giddy; at other times he may feel giddy, without staggering. Sometimes vertigo passes off on opening the eyes, and sometimes on closing them. As a rule headache soon follows.

*Varieties*.—Vertigo may be constant or paroxysmal, felt Varieties. only on moving the head, or in standing, or sitting; but may come on during sleep. In many cases it betokens general weakness or is associated with convalescence from

fevers or from acute diseases, or it may be symptomatic of diseases of the alimentary canal, of the heart or of the kidneys. Prolonged lactation also causes giddiness.

Insensibility

IV. *Insensibility, stupor, coma*, are synonymous terms signifying loss of consciousness. Coma may be due to injury to the skull; to alteration in the supply of blood to the brain; to effusion of serum or blood upon the brain; or to poison in the blood, introduced from without or generated within, as in uræmic poisoning, and in epileptic convulsions. The observer should be on his guard against the feigned insensibility of malingerers.

Sleep.

V. *Sleep* may be described as a condition in which the waste of tissue is reduced to a minimum and is essential to all animals and even to many plants. In young animals the whole time is occupied in eating and sleep. In India eight hours' sleep is necessary for adults; in old age less sleep is needed, as there is less waste of tissues. In healthy sleep the person at first feels languor and welcomes drowsiness, the emotions and mental faculties are in abeyance, the eyelids then droop, and all the special senses cease to act. The limbs are half flexed, and voluntary movements cease; the eyes are closed, the pupils contracted, respiration and circulation become slow, and finally consciousness is abolished. *Profound sleep* occurs in alcohol and in opium poisoning, in apoplexy, in typhus fever, in fracture of the skull, and in compression of the brain from any cause. *Absence of sleep* occurs in delirium tremens, acute mania, encephalitis, and in many acute diseases. Jaundice has a tendency to prevent sleep or to render it uneasy. Strong tea and coffee also cause restlessness. Women of nervous or excitable temperament, and persons with mental anxieties, and those suffering from heart disease, suffer from imperfect sleep.

Profound sleep.

Absence of sleep.

Dreams.

VI. *Dreams* occur during imperfect sleep, generally towards morning when consciousness is returning. Chil-

dren get dreams when they suffer from teething or worms, or from irritation of the bowels.

VII. *Somnambulism* is a state of dreaming in which the patient carries out his movements as if awake. Shakespeare's description of Lady Macbeth (Act v, S. 1) gives a most exact idea of this state : " The eyes are open but their sense is shut."

Somnam-  
bulism.

VIII. *Nightmares* are horrible apparitions, or apprehensions, and the patient feels unable to stir in bed. He experiences a sense of suffocation or a feeling of oppression of weight on his back ; and attempts to move his arms, but finds he cannot. There is palpitation of the heart.

Nightmare.

IX. *Delirium* is a temporary disorder of the mental faculties, as revealed in the language and action, and ranges from slight wandering to complete derangement of the mind. When slight the patient can be roused to answer questions coherently. Delirium may be constant but is generally worse at nights ; it may be mild, quiet, noisy or violent ; or it may be low, with muttering and picking of bedclothes. The patient may be talkative or cheerful, or suspicious of all around him.

Delirium.

*Varieties.*—The chief are that due to organic or functional derangement of the brain ; that to diseases of abdominal viscera, as stomach, bowels, or uterus ; and the forms produced by alcohol, belladonna, opium, or other poisons. *Alcohol* is an acute poison, and destroys life rapidly if taken in a very large dose. Its effects are the result of direct irritation, or of its influence on the brain, or of its circulation through various organs and tissues, leads to their disorganization, interferes with their nutrition, oxygenation, and metamorphosis. The tissues thus become degenerate, their poisonous elements circulate with the blood, and thus cause death. The commonest form is known as delirium tremens, and is marked by tremors of the limbs, fear of surrounding

Varieties.



objects, and wakefulness. In favorable cases it terminates in a critical sleep. The delirium is fidgetty or busy, and the delusions are superficial, as of rats crawling over the skin. Delirium occurring during the day is serious. In fevers and other diseases it usually occurs at night. In acute diseases of the brain and its membranes it is active.

Spinal  
symptoms.

*Symptoms connected with the spine.* The spinal cord is a centre of motion and sensation to the trunk and extremities, and its functions have an intimate relation with those of the brain. Symptoms connected with diseases of the spine are—1. Local manifestations, as evidenced by touch or feel. 2. Derangement of motion and sensation of both lower extremities and trunk. 3. Failure of their nutrition. 4. Muscular wasting (general or local). 5. Paralysis of the bladder or rectum. 6. Deranged appetite.

Motion  
increased.  
Spasms.

Tonic.

*Alterations affecting motions:* motion is *increased* and muscular spasm is said to exist. It is of three kinds: tonic, choreic, and clonic. *Tonic* spasm is characterised by fixed rigidity; often the contractions are partial, always of considerable duration. The affected muscles are hard, but there is no loss of consciousness. Tetanus, cramps, and subsultus tendinum are examples. *Subsultus* is a muscular jerking movement of the tendons of the muscles of the wrists, such as occurs in continued fevers. The *shaking* caused by large doses of quinine has been mistaken for it. Closely allied to this are the movements known as picking of bed-clothes, which indicate extreme nervous debility. *Choreic* spasm: a jerking, irregular movement due to an affection of the motor nerves, which prevents them from acting precisely under the control of the will.

Choreic.

Clonic.

*Clonic* spasm consists of successive contractions at short intervals, as in ordinary convulsions; they may be partial, or limited to one set of muscles (unilateral), or stronger on one side than on the other; periodic or otherwise; reflex

as depending on worms, teething, &c. ; or caused by the presence of albumen in the urine, or by the poison of strychnia.

*Cramp* is a modified form of convulsion. It is generally limited ; and occurs in cholera, arsenic poisoning, &c. *Rigidity* is a violent contraction or stiffness of muscles ; occurs in cerebral irritations, and it chiefly affects the extremities. When confined to one region, as to the recti muscles, it shows that there is some tender organ beneath. Convulsions are an alarming nervous disorder ; they come on in paroxysms, produce distortion of the face, are often attended with loss of consciousness, and with spasmodic movements of the muscles of the body. They may be slight and localised, unilateral or general, and are most common in children.

Motion is *diminished* in muscular debility ; and thus it is in acute diseases, in actual prostration, and in torpid persons. *Paralysis* or palsy is its extreme condition and implies a complete or partial loss of motion or of sensation, or of both, in one or more, or all parts of the body. Paralysis is the result of disease or injury of the brain of the cord, or of a nerve, and it occurs in several forms.

1. Complete paralysis, where both motion and sensation are greatly diminished or lost. 2. Motor paralysis. 3. Sensor paralysis. 4. Paralysis may be general, affecting the whole body, or *partial*, affecting only a portion of the body. It is called hemiplegia when the paralysis is limited to one side of the body ; paraplegia when it affects all parts below any given transverse line. 5. Local paralysis is that confined to the distribution of one nerve or set of nerves, as amaurosis, or facial palsy. 6. *Infantile* paralysis is of this kind. 7. *Cross* paralysis is where there is paralysis of one side of the face (left) and of the opposite side (right) of the body. 8. *Disseminated*, as where one

Cramp.

Rigidity.

Convulsions.

Motions.  
diminished

Paralysis.

Complete

Motor.

Sensor.  
General.

Local.

Infantile.

Cross.

Dissemi-  
nated.

right arm and one left leg or other non-continuous parts are paralysed.

Altered  
sensations.  
Increased.

*Alterations affecting sensations.*—*Increased* sensations (hyperæsthesia) may range from the slight over-sensitiveness to light, sound, heat, and cold, which exists in many weak conditions of the body, to actual pain, with all its varieties of degree, character, and position. It must be remembered that the pain and the morbid change are not always identical in anatomical position. Thus in hip disease pain is felt at the knee, not at the hip. In stone the glans penis, and not the bladder, is the seat of pain.

Diminished.

*Loss of sensation* (anæsthesia), may be local or general. It is a paralysis of sensibility, and is occasionally a phenomenon of hysteria. Its most common seat is the skin, and it may be so complete as to prevent any display of sensibility, even on the application of a strong electric current.

General  
appearance.

#### SYMPTOMS CONNECTED WITH THE GENERAL APPEARANCE.

Under this head may be considered—

*State of nourishment* or general condition of the body.

Posture of  
the patient.

*Posture.*—In *coma-vigil* and *typhus*, for example, the patient lies prostrate on his back with eyes wide open, not sleeping yet insensible to all around. In some diseases of the *eye*, or *acute cerebral diseases*, the posture is such as to avoid light. In *spinal* or *cerebro-spinal* diseases, as tetanus, and in poisoning by strychnia, the spine is arched (opisthotonos or emprosthotonos) and the body supported at each end only. In advanced *heart disease* and in *pulmonary affections* the posture is one of sitting with head propped up by pillows. In *exhausting diseases* and just before death the patient lies on his back, is restless, and is

sinking down towards the bottom of the bed. In *acute rheumatism* there is as complete quiescence of the muscular system as the patient can attain.

*Decubitus.* In cases of general *debility*, in *paralysis* of the extremities, in *rheumatism* of the joints, or in *injuries of the spine or brain*, the patient is unable to rise in bed. There is inability to lie down. In cases of great *dyspnœa*, the patient lies on his belly; in *colic*, with his knees drawn up; in *peritonitis*, on his back; in *pleurisy* or *pneumonia*, on one side. In pleurisy the patient lies at first on the healthy side, and subsequently on the affected side. In disorder of the *liver* and in case of *enlargement of the heart* the decubitus is dextral. Decubitus.

*Expression of face.*—In *anæmia* there is an extremely pale and bloodless condition of the skin of the face, and also of the mucous membrane of the lips and eyes. In extreme *exhaustion*, the face is very thin, and the eyes deeply sunken, and the nose peaked and prominent, forming what is called *facies hippocratica*. Hippocrates described such a face as a sign that death has actually taken place; it often indicates death or its approach; but it may also occur in states from which recovery takes place. In *diabetes*, the skin of the face and also the lips are dry and harsh, and the cheeks are sallow. In *cancer*, the face is yellowish and cachectic-looking. In *acute rheumatism* it is usually full and perspiring. The sclerotic is abnormally white, pupils dilated, and the lips of a bright red colour. In *typhoid* fever, the face is clear, with a bright flush on the cheeks. In *typhus* fever expression is dull and heavy, the face dusky looking, and the conjunctivæ injected. In *mania* and *hydrophobia*, the expression is wild and fierce, as in rage. In *melancholia*, it is desponding. In *idiocy* or *dementia*, a vacant look and a purposeless smile are usually present. In *delirium tremens*, there is an expression of terror. The patient Expression of face.



looks suspicious, and the movements of his facial muscles are rapid and expressive, as if he were talking with his whole face, and not only with his lips. In *hypochondriasis*, there is a sad and desponding air. In *epilepsy* a purplish face immediately precedes the fit, and distortion and rolling inwards of the eyeballs take place during the fit. Epileptics generally look dull. In *hysteria*, the face is distorted during the fit, but natural during the interval. The eyeballs are often prominent. The pupils are dilated, the conjunctivæ bright, the eyelids tremulous. In *paralysis*, the face is distorted by being drawn by the unaffected muscles towards the sound side. In *chronic bronchitis*, with *emphysema*, the lips may be blue and the face dusky. In *pneumonia*, there is occasionally a vesicular eruption on the lips, the cheek of the affected side is flushed, and the lips are dusky. In *phthisis* the face is wasted, has prominent cheek bones, and a hectic flush. In *abdominal disorders* and in *pericarditis* the expression is extremely anxious. In *morbus cæruleus* the whole of the face looks purple. In *organic heart disease* the face is pale at first, but after a time the capillaries of the cheek become injected and prominent, and later, the face may grow bloated and purplish. In *chronic Bright's disease* the skin of the face is pallid and pasty, and the sclerotic is pearly white and watery.

#### ORGANS OF SPECIAL SENSE.

Organs of  
special  
sense.

Eyelids.

1. *Eyes.*—*Eyelids.* In local diseases of the eye, in erysipelas, and in Bright's disease, the lids are oedematous, and this may also be due to boils on the scalp. In paralysis of the third pair of nerves the lids are dropped (ptosis). Xanthelasma palpebrarum is a small yellowish growth, is often associated with sick headache and cerebral tumour, and is distinctly hereditary. *Eyeballs.* In a tumour behind the orbit the eyeballs are prominent, as in

Eyeballs.

exophthalmic goitre. In congestion of the brain they are prominent in a less degree and turgid. In cholera, wasting diseases, and in phthisis, the eyeballs are sunken within their sockets. In cerebral irritation in children they roll from side to side, or there may be squinting. In typhus fever, in cerebral diseases, and occasionally in mania, and also in catarrh of the nose and of respiratory passages, the eyeballs are injected. Inequality of the eyeballs is a congenital defect of very rare occurrence. *Conjunctivæ*.—In kidney diseases they are watery looking and œdematous; in jaundice, yellowish; in pyæmia, and in cases with profuse purulent discharges, they are blue and transparent. *Vision*.—In strabismus, or in many diseases of the eye, owing to changes in the optic nerve, there is double vision, and it is a sign of extreme debility due to mental strain, loss of blood, &c., to see objects which are not present. The dagger which Macbeth saw was of this nature. *Cornea*.—Arcus senilis, a greyish ring at the insertion of the cornea, is generally due to fatty degeneration. It is common in aged people, but is of some value as indicating the general condition of the tissues in young people. *Lustre* of the eye generally becomes less before death. *Pupils*.—In inflammation of the brain, in poisoning by opium, aconite, and Calabar bean, the pupils are contracted, as also sometimes on one side in hæmorrhage and injuries. In apoplexy, in hydrocephalus, in compression of the brain, in poisoning by belladonna, hydrocyanic acid, and stramonium, the pupils are dilated.

Conjunctivæ.

Vision.

Pupils.

2. *Ears*.—Ringing in the ears arises from the continued use of quinine, from nervous debility, and from congestion of the brain. *Deafness* may be produced by congenital defects in the ear, by severe coryza, as in scarlet fever, by wax in the ear, by quinine; and may occur in typhus and typhoid fevers, in cerebral softening, and after scarlet fever.

Ears.

Nose.

3. *Nose*.—In ozæna, in cases of polypus or syphilitic ulcers, there is a foetid discharge. Epistaxis, or bleeding from the nose, occurs as a result of mechanical injury, of acute brain diseases, and in fevers, in hæmorrhagic diathesis, in purpura, and in violent coughing; or it may be vicarious to menstruation. It is most frequent during childhood.

Alimentary  
canal.

### SYMPTOMS CONNECTED WITH THE ALIMENTARY CANAL. DIGESTIVE SYSTEM.

Mouth.

*Mouth*.—In *paralysis* it is drawn to one side and distorted.

Lips.

*Lips*.—In anæmia are pale and bloodless. In the typhoid state of the system and in high continued fever the lips are covered with sordes and dry or parched. In scurvy they are cracked, swollen, livid, and bloody. In acute rheumatism, in typhoid fever, and in phthisis, they are bright red. In exhausting diseases towards the close of life, the lips and tongue are covered with aphthæ. In infants aphthæ accompany general catarrh of the alimentary tract. In chronic bronchitis, and in other severe chest diseases, in morbus cœruleus, and in emphysema, they are blue and dark coloured. In pneumonia and in severe catarrh the lips are often covered with herpes.

Gums.

*Gums*.—In lead poisoning we find a blue line along their dental margins, and copper and mercury cause a redness along the same line. In diabetes the gums shrink from the teeth, and the teeth are loose. In cases of salivation the gums are swollen, are of a strawberry colour, and of a peculiar smell.

Saliva.

*Saliva*.—As an effect of mercury, or iodide of potassium, or chewing seed of dhatūra, saliva is increased. In fever, in chronic diseases, and in affections of the

throat and stomach, the saliva is scanty, thick, and viscid.

*Teeth.*—In low fevers and in typhoid state of the Teeth. system, they are covered with sordes. In scurvy and in salivation they are loose in their sockets. In scrofula decayed, and their edges rugged. In syphilis they are small, smooth, rounded, peg-shaped, the incisors notched and tuberculated. In brain diseases in children, and in cases of reflex irritation, as of worms, there is grinding of the teeth.

*Tongue.*—In anæmia and general debility the tongue Tongue. is large, flabby, indented by the teeth, and tremulous. In exhausting diseases aphthæ are very common over the tongue as well as on lips. In abdominal diseases, as stomatitis and gastritis, the appearance is abnormally red, or shining and smooth, like parchment. In dengue fever it is red at the tip and edges, and often glazed in the middle. In the early stage of fever, in most cases of inflammations, and in dyspnœa, it is covered with a white creamy fur. In acute rheumatism the fur is extremely thick and usually white. In low fevers the tongue is generally brown or black, cracked or fissured, and is protruded with difficulty. In typhoid fever it is glazed, dry and fissured or furred in the middle, and florid at the tip and edges. In diabetes it is of a raw-red or beefy appearance, and somewhat dry. In scarlet fever the colour of the tongue is white, or red like a strawberry, and with prominent papillæ projecting through the fur, the papillæ being most marked at the tip. The non-protrusion of the tongue in apoplexy and in typhus fever is probably sometimes due to the fact that the patient does not hear the request, less often to debility or paralysis of its muscles. In tubercular meningitis the difficulty of protrusion distinctly increases as the disease progresses. In the last stage the patient ceases to put the tongue out at all. In chorea the tongue is protruded with



a jerk, and almost immediately retracted. In general paralysis its protrusion is accompanied by peculiar fibrillar movements. In paralysis of half of the body it is drawn to one side. Acute glossitis is a mechanical cause preventing protrusion. The marks of bite upon the tongue suggest epilepsy, and are indeed often the only distinct evidence of nocturnal attacks of that disease. Extreme retraction of the tongue is sometimes practised by impostors who pretend to have had that organ cut out. In delirium tremens it is highly tremulous when protruded. In collapse and in cases of cholera it is cold to the touch, and of a livid hue.

Taste.

*Taste.*—In hepatic derangements, in dyspnœa, and in fevers, there is often a bitter taste in the mouth ; in gastric indigestion a very sour taste ; and in hæmoptysis, and hæmatemesis, a saltish taste in the mouth often precedes the appearance of the blood.

Appetite.

*Appetite* diminished (anorexia) in dyspepsia, and constant exposure to heat, and, of course, in a large proportion of diseases. Appetite is inordinate (bulimia) in convalescence from acute diseases, in diabetes, in cases of worms, and in some nervous disorders. In chlorosis, pregnancy, and in hysteria, there is a desire to eat rubbish, such as charcoal and slate pencil.

Thirst.

*Thirst.*—In high fever, in diabetes, in low or collapsed state from exhausting diseases, and in cholera, the thirst is excessive.

Swallowing.

*Swallowing.*—In diphtheria, croup, in ulceration of epiglottis (syphilitic, malignant, or tubercular), in paralysis of the muscles of deglutition, in œdema or ulceration of the larynx, in inflammation of the fauces, pharynx, or tonsils, in spasmodic diseases of throat, as hydrophobia or tetanus, in stricture of the pharynx or œsophagus, in cases of obstruction of the pharynx by a foreign body, as a tumour, in retro-pharyngeal abscess, in cases of great debility, where

the patient is in a moribund state, the swallowing of food or drink is imperfect or obstructed.

*Vomiting.*—Vomiting *without nausea* occurs in the early stage of cerebral diseases, and is a result of sudden rise of body temperature, as in intermittent fever, and continues even after the stomach is empty. It is excited on the least movement and there is no accompanying tenderness on pressure.

Vomiting  
without  
nausea.

*Vomiting with nausea.* In diseases of stomach and œsophagus, in affections of the liver, nausea with vomiting is the first symptom; there is tenderness on pressure. A severe kind of vomiting, probably due to a nervous cause, occurs as a result of swaying motion, whether of the sea or of a swing. In inflammation of the brain or its membranes, in many diseases of the lungs, during the passage of gall-stones or calculi, in advanced cases of heart disease, and in diseases of the liver and kidneys, vomiting is intense. In India nausea and vomiting are often the symptoms which first draw attention to the commencement of an attack of smallpox.

Vomiting  
with nausea.

*Pyrosis* is a vomiting, of thin, watery fluid, which is sometimes acid and insipid. In some diseases of the stomach the vomited matters contain certain vegetable organisms, called *Sarcinæ*, and a ferment like yeast.

Pyrosis.

*Hæmatemesis* is a vomiting of blood. The blood may be bright and in large quantities, as in cases of gastric ulcer.

Hæmate-  
mesis.

It may be in large quantities but not bright, as in the profuse gastric hæmorrhage due to cirrhosis and other obstructions of the portal system. The blood vomited may be small in quantity and bright as in cases of mechanical irritation, as from powdered glass. It may be small in quantity and dark, as in cancer. Violent and long-continued vomiting usually leads to the ejection of

Green  
vomiting.

bile, and hence the vomited matters are green. Such vomiting frequently occurs in peritonitis and in sea-sickness. Some authorities state that hysteria forms an exception, and that however violent the vomiting in this disorder it is never bilious. Still more violent vomiting, which accompanies hernia and other obstructions of bowels, is often stercoraceous. Vomiting in a married woman is a possible sign of pregnancy.

Stercora-  
ceus.

Bowels.

*Bowels.* The chief symptoms as far as stools are concerned, relate—(1) To their discharge or retention, and (2) to their appearances when discharged. Certain drugs, it must be remembered, alter the appearance of the stools. Iron stains them black, and logwood red. In jaundice the stools are clay-coloured, owing to absence of bile. In intestinal catarrh in children, and after doses of calomel, they are green, owing to its excess. After hæmatemesis and in hæmorrhage of the bowels they are black from altered blood. Hæmorrhoids often give rise to a copious discharge of brighter blood mixed with the stools, and a similar discharge may occur from a variety of other circumstances. Various foreign bodies, such as parasites and indigestible and ill-digested materials, may be embedded in fæcal masses. Enlarged and very hard fæces follow an accumulation, and in intestinal catarrh the consistence of stools is gradually reduced till they are watery. A similar discharge, known as rice-water stools, is characteristic of cholera. In dysentery shreds of mucus accompany very fluid stools. The stools of typhoid fever resemble pea-soup; they are simply loose, rather pale stools, with finely divided particles of ill-digested food.

## SYMPTOMS CONNECTED WITH THE URINARY SYSTEM.

Urinary  
system.

The terms in common use are—*Dysuria*, difficult micturition. *Strangury* painful micturition. *Ischuria*, retention of urine. *Enuresis*, incontinence of urine. *Diuresis*, excessive quantity of urine. *Hæmaturia*, blood in the urine. *Hæmatinuria*, dark-coloured urine, containing only colouring matter of blood (hæmatin).

*Characters of healthy urine.*—The quantity of urine passed during health in twenty-four hours is about fifty ounces. It is of a light yellow colour, sp. gr. 1018 to 1020, and contains in solution a variety of salts. With regard to the method of its discharge and in each of these particulars symptoms may be observed:—*Dysuria* is usually due to causes which are in the province of surgeons, such as stricture. *Strangury* is due to the same kind of causes, and also to certain drugs as cantharides, turpentine, &c. *Ischuria* and *enuresis* are due to abnormal conditions of the bladder or passages or their innervation. *Diuresis* may be due to an abnormal condition of the passages, to nervous influence, or to the imbibition of unusual quantity of fluid, or to diuretic drugs. *Hæmaturia* originates from the kidneys, ureters, bladder, or urethra. It may be due to congestion, acute Bright's disease, fungous growth, as cancer, or foreign body, as calculi in kidney, ureter or bladder, or irritating drugs as cantharides, turpentine; sometimes an injury to the kidneys causes it; or it may be symptomatic of diseases due to a low state of blood. It is endemic in Mauritius, and is there said to be due to the presence of a parasite infesting the kidney. *Hæmatinuria.*—The urine is passed in paroxysms, with intervals of clear urine.

Characters of  
healthy  
urine.

Dysuria.

Strangury.

Diuresis.

Hæmaturia.

Hæma-  
tinuria.

*The quantity of urine.*—An increase in the quantity of urine occurs in chronic Bright's disease with granular

Quantity of  
urine.



kidney, in hysteria, in the beginning of fever (cold stage of ague), in diabetes, and in the cold season. It is diminished in acute Bright's disease, in the last stage of fever, and in more advanced diseases of the heart. If during the progress of any acute disease an increase in the quantity of urine takes place, after it has been diminished from the commencement, it is always a favorable sign.

Specific  
gravity.

*Specific gravity in disease.*—The sp. gr. is diminished in nervous affections, granular degeneration of the kidneys, and generally when the urine contains albumen, cold stage of fevers, and collapse; but is increased in diabetes and in inflammatory diseases.

Colour.

*Colour in disease.*—The urine is of a pale straw-colour in nervous diseases, in diabetes, in granular degeneration of the kidneys, in the phosphatic diathesis, and in gout. It is deep orange but transparent in fevers, and especially in rheumatic fever. It is milky when voided in the form called chylous urine, which contains normal chyle, albumen, fibrin, red corpuscles, and molecules of fat. Urine is also milky when accompanied by pus; and such occurs in suppuration of the kidneys, or of a portion of urino-genital tract, or when an adjoining abscess opens into the urinary cavities. It is yellowish or red or brown in active inflammations and in fevers, and is dark as porter in jaundice and in acute Bright's disease. It is blue when indigo is taken into the stomach, as when given by empirics for epilepsy. It is black in carbolic acid poisoning, a condition not uncommon since the introduction of the antiseptic method. The quantity of lotion absorbed by an ulcer is quite sufficient to produce urine which, if not black when discharged, becomes so on standing, or on addition of a drop of nitric acid.

*Reaction.*—Healthy urine is faintly acid and never alkaline, unless when passed immediately after a fast. It may

be alkaline in disease, or too strongly acid. The urine is alkaline after long use of potassa, soda, lithia, oxalates, or phosphates of lime, and when there is general depression of the vital powers. In many diseases of the bladder the decomposition of the mucus it contains converts the urea into carbonate of ammonia, and hence the urine becomes alkaline. Its reaction is too highly acid in acute rheumatism. Reaction.

*Sediment* is found in the urine either when first passed or after standing for a time. The precipitation may be due to one of three circumstances. 1. The urine may be a saturated solution at the temperature of the body, and therefore incapable of retaining its dissolved substances at the lower temperature of the air. 2. To the presence of insoluble substances at the time it is passed. 3. To chemical changes which have gone on in the urine after it has been passed. Sediment in urine after being kept for a time.

I. *Sediment in urine after being kept for a time.*—Excess of urates often produces a copious deposit. The quantity of urine is small; the color very high. The urine is clear when first passed, but becomes clouded on being allowed to stand. The sediment stains the side of an earthenware vessel. The reaction is highly acid, and the sp. gr. rather high. The deposit is amorphous, and may be white or reddish; it is dissolved on being heated, but reprecipitates on cooling; it is soluble in alkalies and solutions of alkaline salts. After addition of acids to the urine crystals of uric acid are formed. This form of sediment is common in persons who indulge in excess of food or in whom too great disintegration of tissues is going on. In wasting diseases it is a rough measure of the rate at which disintegration of tissues is proceeding. It is more common in inflammations of serous than of mucous membrane. When it occurs during convalescence from inflammations it depends on the absorption of the exudation Increase of urates.  
  
Common in.

products, and as such it indicates recovery. In eruptive fevers the deposit of urates is generally observed during defervescence, and its absence suggests an incomplete cessation of the morbid condition. In rheumatism and in gout the deficiency or absence of urates in the urine, especially at the time when the affected joints begin to improve, shows that other joints will soon be involved.

Albumen.

II. *Albumen* is found in all those diseases of the kidneys known as Bright's disease, in heart diseases, and in all febrile diseases in which the temperature is high, and in cases where the urine contains blood, semen, chyle, or pus. The quantity of albumen present varies. The quantity is large in chronic Bright's disease with granular kidney; small in acute Bright's disease. Albuminous urine varies in colour from circumstances not directly dependent on the albumen. Thus, in acute Bright's disease it is smoky or red, owing to the colouring matter of the blood, while in chronic Bright's disease it is paler than natural. The specific gravity is always low, except when the total quantity of urine excreted is very small; it varies from 1004 to 1015. A white precipitate of albumen is thrown down on the application of heat and nitric acid. The albumen is in solution, unless present in some solid deposit, such as pus. The amount of albumen present in proportion to the volume of urine varies. It is very large in acute Bright's disease; scanty in one chronic form of Bright's disease (that with granular kidney); abundant in another (that with large pale kidney); intermediate between these in a third form (that with amyloid kidney).

Bile constituents.

III. *Bile constituents* are present in every variety of jaundice, and produce a dark yellow or mahogany colour, the edge of the fluid being for the most part yellow. A green colour is produced on bringing the urine in contact with a drop of nitric acid, and the green tint is succeeded by purple and brown.

To demonstrate the presence of biliary acids, take one part of urine, add to it two thirds of its bulk of sulphuric acid and a little sugar, and a violet tinge will appear where the urine meets with the acid. Another test is to add one part of chloroform to two parts of urine, when a yellow colouring matter will be thrown down. Tests.

IV. *Blood*.—The urine is of a port-wine colour ; and the microscope detects abundance of blood-corpuscles. When allowed to stand for a time a clot of fibrin is formed ; on application of heat the urine becomes opaque, from its containing albumen, and a drop of nitric acid immediately produces an increased precipitate. Blood.

V. *Chlorides*.—Are deficient at the height of the disease in pneumonia. A copious precipitate on the addition of nitrate of silver shows the presence of chlorides. Chlorides.

VI. *Chyloserous urine*.—Is of a milky colour, and usually opalescent or pinkish, from admixture of blood and pus. It is not affected by heat, but becomes clear if agitated with ether ; and when the ethereal solution is evaporated, yellow oil globules are left. Chyle corpuscles, and granular matter are detected by the microscope. Chyloserous urine—  
Colour.

*Sediment in the urine when first passed :*

I. *Mucus* in the urine gives it a foetid ammoniacal smell, and soon undergoes putrefactive change. The urine is alkaline. The deposit floats and is viscid, tenacious, of a dirty yellow colour, and gelatinous ; it appears unmixed after agitation, but the urine is made whitish. No albumen is found on chemical examination, nor is there any deposit by heat or nitric acid ; the precipitate does not become gelatinous by addition of ammonia or potash ; acetic acid has no gelatinous effect, but coagulates the mucus. Sediment in  
urine when  
just passed  
Mucus.  
  
Tests.

II. *Oxalates of lime*.—The quantity of urine is increased when oxalates are present, but the specific gravity remains normal. The colour of such urine is pale green, citron, or dark amber, and its reaction is acid. There is a mucous cloud Oxalate of  
lime.  
  
Tests.



floating on the surface, with a few bright specks here and there. Oxalates are distinguished from urates by not being dissolved on the application of heat; on evaporation they are deposited as a white powder, and this deposit is soluble without effervescence in all mineral acids, but not in acetic acid, and is reprecipitated by ammonia or potash. Transparent octohedral or dumb-bell shaped crystals, with sharply defined edges and angles, are easily found by the microscope; when viewed in a bright light they resemble cubes marked with a cross.

Phosphates.

III. *Phosphates*.—In cases of disintegration of the brain and nerve tissues phosphates are in excess; in delirium tremens they are deficient in quantity. They form a white, yellow, or red deposit, and occasionally a pellicle on the surface. They are insoluble in alkalies, but soluble in mineral acids and in acetic acid. They are reprecipitated by ammonia, and form little masses when the urine is heated. Under the microscope they are seen as triangular prisms, or they appear as amorphous granular matter and narrow dumb-bells, forming compound figures.

Tests.

Pus.

IV. *Pus* is found in suppurative inflammation of the kidney or bladder, or of the urethra, and may cause a foetid and ammoniacal smell; it has an acid reaction. The deposit is greenish yellow, or cream colour, and is generally diffused throughout the urine. It is distinct from mucus by being unaffected by acetic acid. A sediment is deposited by heat and nitric acid, due to the albumen of the pus; on addition of alkalies the deposit becomes converted into a thick gelatinous mass; microscope reveals pus-cells.

Chemical test.

Sugar.

*Abnormal substances other than sediments.* I. *Sugar*.—When formed in the urine it is always associated with an increase in the daily quantity, and such urine has a pale straw colour and sweetish smell. The sp. gr. is high, 1025 to 1060. After the urine has stood for some time *Torula cerevisiæ* appears as a result of alcoholic fermentation.

*Chemical tests for sugar.*—When the urine is left in a warm place a scum is formed on its surface. 1. Add half the bulk of Liq. Potassæ to the urine and boil, when it becomes dark brown. 2. Add a drop of solution of sulphate of copper to the urine, and then Liq. Potassæ in excess; this will give it a purple tint. On boiling the mixture an easily detected yellow-brown precipitate of sub-oxide of copper appears. If there be no sugar the mixture will become green before boiling, but after boiling a black precipitate will fall. 3. Or, add a drop of dilute solution of salts of tin to a drop of urine, made alkaline with sodium carbonate and evaporate. If sugar be present the residue becomes dry and hard, and a deep brown or a greyish-black deposit is thrown down. 4. Or, if a drop of alkaline solution of chromate of potash be added to a drop of urine and evaporated, the deposit will be deep green. Under the microscope *Torulæ* may be seen. The *Torula* or yeast fungus is a round transparent body, nucleated, and  $\frac{1}{2500}$  to  $\frac{1}{7000}$  of an inch in diameter. It consists of a thin-walled sac containing protoplasm, in which is a vacuole. The *Torulæ* may be associated in heaps or strings, and are living, and capable of multiplication.

Chemical tests.

II. *Excess of urea* is associated with a remarkably high specific gravity. Chemical test: add equal parts of cold urine and nitric acid together, and irregular rhomboid plates of urea are formed. If the deposit be treated with nitric acid, and then ammonia be added to it when cold, a beautiful purple murexide will be developed. Under the microscope granular matter, and spheres with spicules sticking on them, are seen. The average quantity of urea excreted in twenty-four hours is 255 grains—uric acid being 8·1.

Urea, excess.  
Tests.

III. *Excess of uric acid* exists in urate of soda or urate of ammonia and may occur as a heavy red sand, in reddish brown urine, of which a rather small quantity is passed in

Uric acid, excess.

Tests.

the day. The deposit is soluble on being heated, and also on the addition of hydrochloric acid. With nitric acid and ammonia it gives purple murexide. The microscope shows lozenge-shaped crystals, and irregular, amorphous, striated masses.

*Indican.* *Indican* has been ascertained to be a normal constituent of urine, and the occasional presence of indigo blue in decomposing and morbid urine is due to this peculiar body.

Respiratory  
system.

## THE RESPIRATORY SYSTEM.

*Respiration.* The normal number of respirations in a healthy adult when at rest is from 16 to 18 in a minute. Their frequency may be increased, and their intensity. Dilatation of the alæ nasi with each inspiration indicates the latter.

*Frequency.* In fevers, nervous disorders, and in chest diseases, its frequency is increased. In fatty degeneration of the heart it is sighing and interrupted. In extreme cases of narcotic poisoning respiration is slow. In opium poisoning, in coma, apoplexy, drunkenness, it becomes stertorous, owing to the relaxation of the velum palati.

*Characters.* In laryngitis it is long and wheezing. In croup the inspiration is of a crowing character. In acute pleurisy, in pleurodynia, and in diseases of the spinal cord (between the origin of the phrenic and intercostal nerves) the respiration is chiefly abdominal. In peritonitis, or in other abdominal affections, it is generally thoracic. But it should be remembered that during health respiration is always more thoracic in women than in men.

Voice.

1. VOICE.—(a) *Loud voice.*—In acute laryngitis the voice is hoarse, cracked, whispering, or altogether lost. In laryngeal phthisis it is harsh, or in loud whisper, as if coming from the roof of the mouth. In syphilitic laryngitis it is coarse and often whistling.

(b) *Aphonia*, or *loss of voice*.—It may be transient or permanent, may be functional or structural, ranging from slight impairment to complete dumbness. Sometimes nervous shock produces a feebleness of the voice, lasting often for days together. In acute laryngitis, in paralysis, whether due to a tumour pressing on the laryngeal nerve, or to intrinsic affection, and in some cases of hysteria there is loss of voice. (c) *Dysphonia*, or painful voice, occurs in clergymen, barristers, public speakers, singers, and actors, and is due to a follicular disease, with an irritable condition of the membranes of the larynx and the pharynx.

Aphonia.

Diseases.

Disphonia.

2. THROAT.—In quinsy the throat is red and sore. In diphtheria it is covered with an ash-grey leathery exudation. In syphilis it exhibits superficial foul ulcers with hard base.

Throat.  
Quinsy.

3. DYSPNŒA.—Short breath or difficult respiration is a prominent symptom in many acute diseases. It may be due to poisoned state of the blood, to paralysis of the muscles of respiration, to obstruction of the air passages from any cause, to diseases of lungs or heart, or to dropsical effusion. *Orthopnœa* (difficulty of breathing), so great that sufferer has to maintain the erect posture. It is often present in asthma, bronchitis, pneumonia, diseases of the heart, paralysis, and dropsy. *Dyspnœa* is common in cholera, owing to the morbid change of the blood. In croup it may be due to obstruction of the larynx or trachea, or to the carbonising state of the blood. In asthma it is owing to the spasm of the bronchi. In bronchitis, pleurisy, pneumonia, phthisis, cancer within the chest, heart disease, aneurism of the thoracic aorta, hydrothorax, and in ascites, it is almost always present. Chlorine and other irritating gases give rise to it.

Dyspnœa.

Causes of.

Orthopnœa

Present in  
diseases.

4. COUGH, OR RESONANCE OF VOICE, is an effort to expel irritating matter from the throat, larynx, bronchi, and air-cells. It may also be due to intestinal irritation,

Cough.

Dry cough.



derangement of stomach, enlarged tonsils, or may be simply a hysterical or nervous cough. When nervous, sympathetic, or hysteric, it is dry, hollow, and hacking. In pertussis it has a characteristic whoop on inspiration, and is paroxysmal. In croup (early stage), brassy, ringing or barking, and hoarse. In advanced croup, whistling. In pleurisy, short and restrained. In early bronchitis dry and light. In chronic bronchitis, soft, deep, and loose. In pneumonia, short and sharp. In incipient phthisis, short and hacking. In confirmed phthisis, deep and distressing.

Present in diseases.

Expectoration or moist cough.

In diseases.

5. EXPECTORATION may contain mucus, pus, or blood. In catarrh and early bronchitis and the first stage of pneumonia, the expectoration is simply mucous. In chronic bronchitis, phthisis, and the third stage of pneumonia, it is purulent or muco-purulent. In the second stage of pneumonia it is rusty. In advanced stages of phthisis, nummular and heavy. In gangrene of the lungs, putrid. In croupous or diphtheritic exudation, and in phthisis, and in strictures of the respiratory tract, calcareous matter, blood, and sometimes shreds of membrane, are found in expectoration.

Hæmoptysis.

*Hæmoptysis*.—Bloody expectoration occurs in congestion of the lungs, in heart disease, in phthisis pulmonalis, in the hæmorrhagic diathesis, in mechanical injury to the lungs, in rupture of an aneurism, or in vicarious menstruation. It may be from the lungs, bronchial tubes, trachea, or the larynx.

Breath.

6. BREATH.—(a) *Temperature of breath*.—In fevers the temperature of breath is increased. In cases of prostration, as in cholera (a certain sign of dissolution), the breath is cold.

Odour of breath.

(b) *Odour of the breath*.—In fevers it is heavy. In scurvy, it is foul and foetid. In indigestion, sour. From decayed teeth, offensive. In gangrene of the lungs or in

bronchitis, putrid or rotten, or fæcal or earthy. In deep intoxication the breath has an alcoholic smell. In diabetes, it is of a faint sweet odour.

7. **HICCUP** (singultus) is produced by a sudden and involuntary spasm of the diaphragm, and is due to indigestion, nervous disorders, and exhaustion; it is a short, convulsive, noisy inspiration, followed immediately by expiration. In severe cases it is an indication of great danger. It is most common during infancy and in old age. It is often attended with pain in the præcordial region, and has a tendency to recur at short intervals. Hiccup.

As connected with the respiratory tract, though usually local in their course, coryza or catarrh, ozæna or putrid discharge, and epistaxis, may be mentioned. The first is due to catarrh of the nasal passages; the second is usually associated with diseased bone; and the third is due either to local congestion, or to a general venous engorgement, such as that often caused by valvular disease of the heart.

Food may be returned through the nose, and this is due either to paralysis, or ulceration of the soft palate or imperfect development of the bones of the roof of the mouth.

## THE HEART.

Heart.

Two classes of symptoms, as distinguished from physical signs, are referred to the heart—irregularity in its action and pain. The first includes very feeble action, forcible action, and rapid action; the two latter are included under the term palpitation, and with the first may indicate valvular or other organic disease of the heart, reflex irritation of the cardiac ganglia, or peripheral disturbance of the vascular system. Pain may depend upon organic diseases of the heart, may indicate instant or recent injury, or may be simply reflex. Symptoms.

Physical  
signs of  
disease.

## THE PHYSICAL SIGNS OF DISEASES.

The physical signs of disease are the special results of physical exploration. They are important aids to the determination of the actual and relative position of organs.

Physical  
signs.

### *Physical signs of abdomen.*

Abdomen.

The belly is divided into nine regions, as shown in the diagram below :

Right Hypo- chondrium.	Epigastrium.	Left Hypo- chondrium.
Right Lumbar.	Umbilicus.	Left Lumbar.
Right Iliac.	Hypogastrium.	Left Iliac.

Inspection.

The modes of examination are inspection, palpation, percussion, and auscultation. *Inspection* includes all ocular observations, including measurements, and is of course chiefly directed to form and movement. The abdomen may be enlarged or retracted. Enlargement may be due to pregnancy, ascites, obesity, chronic peritonitis, dilated stomach, tumour in the omentum, or other tumour. *Palpation* includes all observations made by simple touch, both in rest and motion. *Percussion*.—Physical signs of percussion are ascertained by striking the body directly or indirectly. *Auscultation* includes examination by which anything is ascertained by the ear.

Palpation.

Percussion.

Auscultation.

Inspection.  
Abdomen.

*Inspection*.—In the abdomen inspection discovers any enlargement or retraction. Thus a swelling in the right

hypochondrium denotes enlargement of the liver, one in the left enlargement of the spleen. Of general enlargements pregnancy is the commonest, flatus the next; the enlargement of ovarian disease is usually unilateral at first, and that of typhoid fever exhibits a rounding from side to side. Peritonitis also leads to a general enlargement. Retraction of the abdomen is usually general, and is often associated with cerebral disease. Raised position of the knees often accompanies painful abdominal enlargements; it is also the best position for the palpation of the viscera.

*Palpation.*—The first observation to be made on palpation is whether the abdomen is painful or not; next the locality of the pain; tumours or general enlargement of viscera may next be felt. When fluid is present fluctuation may be felt in the abdomen. Palpation.

*Percussion.*—The sound obtained on percussion in health is clear and always slightly tympanitic. If there be a solid or a fluid mass to be percussed, the sound is dull, as in ovarian dropsy, pregnancy, cancer, aneurism, enlargement of the liver or spleen, ascites, retention of urine, or fæcal accumulations. The opinion as to the consistence of any tumour is also confirmed by the percussion. The percussion note is resonant or tympanitic where the intestines are distended with gas. Percussion.

*Auscultation.*—It is a useful aid in the diagnosis of pregnancy, by the detection of fœtal heart sounds and the placental bruit; of abdominal aneurism, by a localised bruit or an aortic murmur along the spine. A friction sound may be heard in the early stage of cirrhosis of the liver, and rarely in peritonitis. Auscultation.

### *Physical signs of the Chest.*

Chest.

*Neck.*—Great swelling and congestion indicate local disease, as in retro-pharyngeal abscess, or are due to remote pressure, as in aneurism of the arch of the aorta. The com- Neck.



monest large tumour is a goitre, or the enlargement of the whole or part of thyroid body. The lymphatics are the origin of most of the swellings in the neck. The motion of the soft palate and of the uvula ought to be observed; they may be impeded by catarrh, or altogether prevented by paralysis; or one side may be paralysed, while the other is in its natural condition. Ulcers and tumours will of course be looked for. The larynx is examined by the laryngoscope; by it we detect organic structural changes in the larynx; changes in the position, shape, and size of the epiglottis; presence of growths or tumours, and paralysis or otherwise of the vocal muscles.

*Respiratory organs of the chest.*—The chest should be laid bare. During the examination of the front of the chest the patient should be made to stand or to sit with the hands hanging down by the side. For the examination of the back a slightly stooping posture, with the head bent forwards and the arms folded across the chest, is necessary. During the examination of the lateral regions the arms must be raised vertically over the head. During examination always remember to notice the condition of the apices of the lungs in front and behind, as well as their bases posteriorly and laterally, the amount of the deposit of fat and muscles, the condition of the ribs and cartilages, and the form and size of the chest.

*Division of the chest walls (thorax) into regions.*—The chest walls may be conveniently divided for purposes of description into regions. These are named according to their position. Thus, *median*, which corresponds to the width of the sternum, and includes (1) Supra-sternal, or the depression above the sternum. (2) Sternal, extending from the upper border of the sternum to the lower border of the third cartilage. (3) Infra-sternal, that which extends from the third cartilage to the lower end of the sternum.

*Antero-lateral.*—A region which is bounded internally

by the margin of the sternum, and externally by the acromion process on each side. Under this head we find—1. Supra-clavicular, which includes region extending above from the outer third of the clavicle to the upper ridge of the trachea. 2. The clavicular or region behind the inner two thirds of the clavicle. 3. Infra-clavicular extends from below the clavicle down to the lower margin of the third rib. 4. Mammary, from the third to the sixth rib. 5. Infra-mammary, from the sixth rib to the lower margins of the thorax. *Lateral*.—This region is bounded in front by

Lateral.

the acromion line and behind by the axillary border of the scapula. It is divided into—(1) Axillary, extending from the apex of the axilla to the sixth rib. (2) Infra-axillary, from the sixth rib down to the lower margin of the thorax.

*Posterior*.—It is bounded by the axillary edge of the scapula in front, and by the spine behind. It includes—(1) Supra-spinous or superior scapular, which is limited to the supra-spinous fossa. (2) Infra-spinous or inferior scapular, to the infra-spinous fossa. (3) Infra-scapular, which extends from the angle of the scapula to the lower margin of the thorax below and to the spine behind. And (4) inter-scapular includes the space between the base or border of the scapula and the spinous processes of the spine.

Posterior.

*Inspection*.—The first observation is as to colour, fat, or œdema of chest walls, and to their movements. The shape and size of the chest is also to be noted, its depressions, the directions of the ribs, and intercostal spaces.

Inspection.

When the outlines are drawn on paper by the help of the cyrtometer, the *antero-posterior* diameter is that which joins the sternum, with the dorsal middle point. The *transverse* is drawn through the middle point of this line. In a healthy chest the ratio between these two should be one to one third. In the new-born infant the diameters are equal and chest circular. Certain other forms of the chest, though not indicating disease, point towards it either in

Diameters of the chest.

Shallow  
chest.

Pigeon  
chest.

Universal  
enlargement.

Local  
enlargement.  
Depression.

Respiratory  
movements.

Shape of  
chest.

the past or in the future. These are called subtypical varieties and are two in number—the shallow chest and the pigeon-breast. In the *shallow chest* the proportion of the diameters is antero-posterior one to transverse one and a half, and, owing to the flatness of the back, the scapulæ often stand out like wings, hence this kind of chest is often spoken of as alar or pterygoid; it also is called phthi-noid chest, and is indicative of a tendency to phthisis. The *pigeon-breast* is produced by pressure on their ribs—at their angles when they are young and yielding, and often formed in the course of severe infantile catarrh, and notably during hooping-cough; the proportion of diameters in it are one to one and a fifth. The chest may be enlarged or contracted, universally or locally, by disease. The commonest cause of *universal enlargement* is emphysema. The chest tends to assume the infantile shape. *Unilateral enlargement* is usually due to pleurisy. Local depressions and contraction have always for cause the exclusion from air currents of some part of the lung. It must always be borne in mind that the primary forces acting upon the chest wall are the pressure of the general atmosphere without, or of the inspired air within. So long as the latter counteracts the former the chest wall maintains its outline. As soon as the pressure is diminished at any point the effect of the constant external atmospheric pressure is manifested to as great a degree as the rigidity of the chest walls will allow.

The conditions of the muscles of respiration are important. Their hypertrophy indicates a long-continued exaggerated respiratory effort. Inspection further examines the symmetry of the respiratory movements. Pneumonia diminishes the movement on the affected side. Pleurisy stops them altogether up to the level of the effusion. The *shape* of the chest is best ascertained by a tape and cyrtometer. The shape may be observed in a circular or

circumferential line, measured round the chest opposite the base of the ensiform cartilage. The circular measurement of an ordinary healthy chest is 33 inches, the right half is  $\frac{1}{2}$  to 1 inch larger than the left; or a transverse line may be taken, measured from the nipple to the middle of the sternum; or a vertical, from the clavicle to the lower border of the ribs; or an antero-posterior measurement may be taken, extending from the sternal end of the clavicle to a corresponding point in the scapular region.

Measurements.

*Palpation* confirms what has been by inspection. We further ascertain the existence of *vocal fremitus*. The fremitus is the movement which can be felt by the hands on making the patient speak. The vocal fremitus is increased when the lung is solidified, whether from phthisis or pneumonia, and is absent over pleural effusions. *Fric-tion fremitus* may be felt while the patient is taking deep breath, and is caused by the two rough surfaces of the pleuræ rubbing against one another.

Palpation.

Vocal fremitus.

Friction fremitus.

Fluctuation may sometimes be detected when there is fluid in the chest.

*Percussion*.—It may be immediate or *direct*, and mediate or *indirect*. Immediate is done by striking the chest directly with the fingers. Mediate is done by placing on front of the chest finger or pleximeter, and striking with the other, or by the hammer. For this percussion, place evenly and firmly the fore and middle fingers of the left hand over the chest, with the palmar aspect next the skin, and with the ends of fingers of the right hand strike upon the other fingers. The stroke should be perpendicular to the surface, quick, sharp, and from the wrist, the elbow remaining stationary. Percussion offers for observation the character of the sound, whether clear or dull, the duration of the resonance, and the degree of resistance or the elasticity of the part percussed. The result of the percussion of a healthy chest is that it

Percussion

Results of percussion.



is resonant everywhere except over the heart, the liver, and the spleen. The area of cardiac dulness will be described when the physical signs of the circulatory system are discussed. The upper boundary of hepatic dulness may be taken to be the fifth rib in the nipple line, the seventh rib in the axillary line, and the tenth rib behind. The splenic dulness is inconstant and varying with the position of the stomach, but its lateral boundaries may be roughly stated as the produced lines of the axillary folds, and its vertical boundaries as the tenth or twelfth ribs. In disease resonance may be abnormally extended, or regions may be dull which ought to be resonant. Complete dulness in any part indicates solidification of the lung, pleural effusion, or a solid tumour. An increased area of resonance is caused by emphysema. Tumours, effusion, and solidified lung have distinctive degrees of resonance, which may be learned by practice, but cannot easily be described in words.

Auscultation.

*Auscultation*, like percussion, may be *direct* or immediate, and *indirect* or mediate, direct when the ear is applied to the chest, indirect when a stethoscope intervenes. The commonest form is a wooden tube with one end slightly expanded. A stethoscope for both ears, with an elastic continuous piece, and many other varieties, are used. Care must be taken that the chest end of the instrument is applied in its whole circumference and without any heavy pressure. Auscultation elicits healthy sounds or *breath sounds*, unnatural sounds or *rales*, *friction sounds* and various *metallic sounds*; also *vocal sounds* (vocal resonance), which are produced during the act of speaking, and of coughing and *succussion* sounds.

Results.

On auscultating the healthy chest a sound the character of which can only be learned by experience, and which is called the *respiratory murmur*, is heard. It is most distinct where the chest walls are thinnest, but with this exception

Respiratory murmur.

is uniform. Disease may cause this sound to *cease*, may replace it by another, or while it remains may cause additions to it. *Pleural effusion* and a *mechanical obstruction* completely filling a large bronchus cause cessation of the respiratory sound. *Solidification* of the lung and its *extensive excavation* by phthisis substitute bronchial and amphoric breathing for the normal murmur. These sounds shade into one another, and for the purposes of explanation may be taken to be identical. The explanation is this. The air entering a bronchus produces a sound such as may be made by blowing down a rigid tube. This clear sound is inaudible in the healthy lung, owing to the intervention of air vesicles filled with air. When the lung is solidified or excavated from the bronchus to the surface this obstruction is removed, and the clear sound is heard, because the stethoscope is in direct relation with the walls of the bronchus. *Additions* to the respiratory sounds may be produced in the lung or outside it. In the latter case they are due to roughening of the pleural surfaces, and are called *friction* sounds. All additions to the respiratory murmur which are not friction sounds are included under the term *rales*, and adjectives describing acoustic quality are added. Thus, rales may be rhonchal, or groaning, sibilant or hissing, crepitant or rustling, and subcrepitant. Sometimes nominal forms of these terms are used, as rhonchus, sibilus, and crepitation.

Cessation of  
respiratory  
sound.

Substitution  
for  
respiratory  
sound.

Additional  
respiratory  
sounds.

The detailed application of these signs to disease will be found under the heads of several chest diseases. Their acoustic explanation is largely hypothetical, but it is a matter of observation that particular morbid changes are indicated by definite sounds or combinations of sounds.

The *sound* of the *voice* heard by way of the chest wall is also observed on auscultation. In the healthy chest it is feeble, being interrupted by the lung filled with air. The same condition which produces bronchial and amphoric

Sound of the  
voice.

breathing gives rise to a clear voice sound, such as is produced in the bronchus, and is hence called *bronchophony*.

Pectoriloquy. *Pectoriloquy* is a term for a shrill kind of bronchophony.

Ægophony. *Ægophony* is used to express a bleating sound, sometimes heard where the thin layer of fluid intervenes between

chest walls and the lung. *Succussion* is a splashing sound, heard when a patient is shaken, and due to the presence, at the same time, of air and fluid in a pleural cavity.

### *Physical signs due to the Circulatory System.*

Physical  
signs of  
heart.

Diseases of the heart materially influence the state of the pulse, and a careful examination of the pulse determines whether the arteries are degenerated or not; and gives further valuable information in diseases of the heart and vessels.

Pulse.

*Pulse*.—It is most rapid in the standing posture, less so in the sitting, and least so in the recumbent; it is more frequent in the morning than in the evening; and the frequency is also increased by food, by exercise to the body and mind, or by both. The normal frequency of pulse at birth is 140 to 150; at infancy, 120; childhood, 100; youth, 90; adult age, 70 to 85; old age, 65 to 75; decrepitude, 60 to 80. In females it is 10 beats quicker than in males. It may in exceptional individuals, even in health, be much slower. Thus, the pulse of Napoleon the First was 40. This phenomenon is often observed in Europeans born on the west coast of Africa.

The pulse  
teaches.

From the pulse we learn—1. The state of the coats of the arteries. 2. Their tonic contraction and elasticity. 3. The force of the heart's action. 4. The fulness or otherwise of the vessels. 5. The condition of the nervous system at the time.

Characters.

*Characters*.—The pulse may be *hard*, *tortuous*, and non-elastic, owing to some change in the structure of the arterial coats; *hard* and *incompressible* when the tone and elasticity of the coats are increased; *soft* and *easily com-*

*pressible* when both the tone and elasticity are deficient ; *full* when the force of blood from the heart is great ; *equal* if the force or flow be constant and the same ; *unequal* if the flow at each contraction of the heart is not equal, nor is the same ; *quick* or sharp when the contractile force (systole) of the heart is sudden and quick ; *slow* when the quality of each beat is feeble, although the number of pulsations per minute be the same ; *jerking*, *thrilling*, or *vibrating*, when the elasticity of the large arterial trunk, as the aorta, is destroyed, as in aortic valvular disease, or in aneurism. The pulse is *weak*, *unequal*, and *irregular*, in mitral diseases ; is full and bounding, or rapid and easily compressible, in acute rheumatism ; is *small*, frequent, *hard*, and *incompressible*, in peritonitis and acute inflammations of serous membranes ; *thrilling*, in anæmia, where the blood is more liquid, and in tubercular meningitis. Inequality in the two wrists indicates organic disease, or that either an aneurism or pleuritic effusion, or a tumour, press over the trunk of that wrist where the pulse is feeble. The pulse is *undulating* where the action of the heart is feeble and the elasticity and tone of the arteries diminished. Visible short pulsations are very common in different parts of the body in aortic regurgitation. In extreme debility it is *rapid*, *small*, or *thready*. *Irregular* pulse may be congenital or due to old age, or may be a temporary symptom during the progress of an acute malady, or during convalescence from remittent fever. The pulse is permanently irregular in organic diseases of the heart, and occasionally in meningitis. *Dicrotous*, or double pulse is found in continued fevers, cholera, and some cases of heart disease. In them it is due to the loss of muscular tone of the arteries, so that the arterial impulse is separated from that of the ventricles by a perceptible interval.

In the investigation of diseases of the heart and vessels, the sphygmograph and cardiograph are used to register the pulse.



Sphygmo-  
graph.

## SPHYGMOGRAPH.

Mechanism  
of.

The *sphygmograph* consists of an elastic spring, on the under surface of which is attached a convex piece of ivory, which is placed over the artery, its other end being fixed to the instrument. The movements of the artery are transmitted through the spring to a lever moving on a pivot, and which is long enough to amplify those movements. At the free end of the lever a pen is attached, which traces the motion on a piece of paper or on smoked glass. By certain arrangements the paper is made to travel quickly and steadily in a certain direction, and can be made to travel or stop by means of a regulator. It is generally traced over the radial pulse. The entire tracing is made up of a series of pulsations or curves; each pulsation corresponds to the whole action of the heart, viz. the systole, and diastole. For the language of the sphygmographic tracing we divide it into a *line of ascent*, a *summit*, and a *line of descent*. The line of descent may be again subdivided into two or three *secondary waves* with intervening *notches*. The first is called the *distension wave*, the second the *great wave* or *true dicrotism*, and the third, which lies between the first and the second, is usually absent. The ventricle contracting more or less suddenly, opens the aortic valves, which give an impulse to the blood in the arteries. This is called a line of ascent or summit wave, or percussion impulse. After this sudden vibration of the valves the arteries partially collapse, and this gives rise to the first part of the line of descent. A wave of blood next passes out of the heart into the aorta, and this gives rise to the first secondary wave, or the wave of distension or systolic pressure. Now there is a reflux of blood towards the heart, by which the aortic valves close; this causes a line of descent, ending in the great or aortic notch. During

Its tracing.

Line of  
ascent.  
(Summit  
wave.)Line of  
descent.First  
secondary  
wave.

Great notch.

this reflux a vibration may occur and cause a third secondary wave, which, however, in most cases may be wanting. Now the aortic valves are suddenly closed by the pressure of reflux blood, and this produces the great second wave, or true dicrotism. Finally, blood flows onwards in the vessels and causes the remainder of the line of descent. This finishes the tracing. It will be now seen that the systolic portion consists of a line of ascent, the first part of the line of descent, or first secondary wave or wave of distension, and a line of descent ending in the aortic notch. The diastolic portion consists of the rest of line of descent, and is, therefore, very small in proportion to the systolic line. The pulse tracing is thus made up of a number of parts; and in each curve of the tracing the length of the line of ascent should be noted, and whether it is vertical or oblique, the shape of the summit, whether acute, rounded or square, the presence, size, and position of the secondary waves, the direction and the length of the line and descent beyond the aortic wave. We have further to observe the relative height and depth of their summits and bases, whether they are on the same level or not. The sphygmographic tracing may vary (1) with the rapidity and the force of ventricular contraction, (2) the degree of arterial tension, (3) the difficulty in the onward passage of blood through the capillaries, (4) the volume of artery, (5) the condition of the valves, (6) the quantity of blood sent to the vessels. The line of ascent may be *vertical* if the ventricle contracts more rapidly, or may be *long* if the force of contraction be great. If the ventricle contracts freely the *summit* will be *rounded*. High arterial tension diminishes the height of the line of ascent, and renders it more *sloping*. It also makes the first secondary wave proportionately more developed, and raises it until it becomes blended with the apex, making it *round* or *square*. It has no minor waves, the aortic wave is lessened, and the remainder line

Third  
secondary  
wave.

True  
dicrotism.

Varieties of  
the tracing  
causes.

of *descent* is *shortened*. *Low tension* has the opposite effects; in this there is vibratory undulation in the line of descent, and the third secondary waves are observed. A *healthy pulse curve* has a line of ascent nearly vertical, of moderate height, an acute summit, a gradual descent, and aortic secondary waves. When the first secondary wave is absent the aortic notch is deep and the aortic wave is prominent; and the pulse is called *dicrotous*.

Sphygmo-  
graph in  
disease.

Cases where  
used.

Indicates.

The *sphygmograph* in disease gives exact information with regard to the circulation. It is employed for the purpose of diagnosis, prognosis, and treatment; is used in aortic regurgitation, in hypertrophy, aneurisms, and degenerations of arteries, but is perhaps chiefly useful as a means of graphic representation. The sphygmographic tracing indicates a grave prognosis when there is a *dicrotous* pulse, also irregular and unequal, a small curve or a short and not vertical ascent, with a roundish and square summit. Such a pulse occurs, as in cases of fever and other acute diseases. In old age the pulse mark has a nearly vertical but sometimes broken ascent, a rounded or flattened summit, and there is deficiency in the second arterial ascent, and sudden fall after the primary cardiac wave.

In aneurism it shows a loss of force in the pulse of the side affected, with lessening of *dicrotism*, and particularly a difference in the radial pulse trace of the two wrists. In aortic regurgitation vertical ascent of the first wave ending in a point, a notable suddenness in the fall that follows the pointed ascent, collapse of the artery without a second ascending wave.

Cardiograph.

The *cardiograph* obtains similar tracings from the cardiac impulses by a modification of the same mechanism. A small drum placed over the heart receives its vibrations, and through the column of air in a tube which opens

out of it communicates these vibrations to a pointed lever attached to the upper surface of a small drum. A sphygmographic or any other registering apparatus receives the trace. The normal trace has three prominent features: 1. A slight rise, indicating the systole of the auricles. 2. A longer rise, equal to that of the ventricles. 3. A wavy line, usually of three parts, corresponding to the movements produced in the blood current by the closure of mitral and tricuspid valves. A descent follows the representation of the cardiac revolution, and is terminated by a small double wave, due to the closure of the aortic valves.

Tracings.

*Displacement of the heart* may be congenital or may occur in pleuritic effusion, emphysema, or cancer of the lung. In some cases the situation of all the abdominal viscera is congenitally reversed, and even the colon, which always ends in the rectum, may do so on the right side instead of on the left.

Displacement of heart.

### *Physical examination of the Heart.*

Physical examination.

*Inspection.*—In a healthy chest there is no break in the outline over the heart, but in hypertrophy there is a definite bulging. *Impulse* is a healthy movement of the apex as seen or felt. It is due to the increase of the antero-posterior diameter of the heart during the contraction of the ventricles; and is best noticed about three quarters of an inch above the apex, owing to the fact that the apex is covered by a portion of the lung.

Inspection.

Impulse.

*Position of the apex.*—In children it is usually found in the fourth intercostal space, and in the line of the left nipple. In adults between the fifth and sixth ribs, an inch and a half below the left nipple, and an inch to its sternal side. In emphysema the position of the apex may be difficult to determine, though an impulse is well-marked in the epigastrium. In hypertrophy or dilatation of the

Seat of apex.

Impulse in disease.



Excited  
impulse or  
Palpitation.

Cases in.

Palpation.

Thrill.

Varieties.

Systolic.

Diastolic.

Friction  
fremitus.

Percussion.

Gentle.

Hard.

heart, in tumours in the chest, and in pleurisy, the apex is displaced to one side or the other. In ascites, ovarian dropsy, or any other tumour in the abdomen, it is pushed upwards. When the impulse is excited it is known as palpitation; it must be clearly distinguished from heaving impulse. *Palpitation* strikes the hand with rapid taps; heaving impulse lifts the hand up. Palpitation is observed in hypertrophy, in chronic valvular disease, in anæmia, nervousness, dyspnoea, brain affections, and tumours in the mediastinum. It is altogether absent in pericardial effusion and emphysema; and often feeble in a weak or fatty heart.

*Palpation.*—Besides impulse we have another movement of the heart, known as *thrill*; it is a quivering sensation felt by the hand over the heart. Thrill is most often caused by the obstruction to the passage of blood through diseased valves. In aortic obstruction the thrill is called *systolic*, and is felt at the base of the heart and to the right of the sternum. In aortic regurgitation, and in mitral obstruction, it is *diastolic*, and in the aortic form it is best felt at the base; in mitral obstruction at the apex; in pulmonary obstruction to the left of the sternum and at the base. Friction fremitus may be felt in a few cases of pericarditis.

*Percussion.*—The extent of dulness varies with the force used in percussing. Gentle percussion detects an area of superficial dulness in parts where the heart is uncovered by the lung. The *superficial area* is triangular in shape, the right border being the mid-sternal line, extending from a point on a level with the fourth cartilage to the upper limit of the dulness of the liver, the base being a line drawn from immediately below the apex beat to the upper limit of the liver dulness. The left side is a line between the apex beat and the fourth cartilage. The dulness exists for a circle two inches in diameter, taking as a centre the middle of the left fifth costal cartilage. Hard percussion brings

out an area of about one inch greater in every direction, and it may be difficult or impossible to make it out, owing to continuity of cardiac dulness with a pleural effusion or a solidified lung. In hypertrophy and in dilatation the *area is increased*; and it is diminished or masked altogether in emphysema, pneumo-thorax and dilated stomach.

*Auscultation.*—On auscultation of the heart two sounds are heard, the systolic and the diastolic. The *systolic* or the first sound is longest and duller, and coincides or accompanies, or is synchronous with the impulse. The *diastolic* or the second sound is shorter and sharper, and follows the impulse. The first sound is best heard between the fourth and fifth left intercostal spaces and just within the left nipple. The second sound at the base of the heart and opposite the junction of the right third costal cartilage with the sternum. Very often the sounds are more or less doubled or repeated and are called *reduplicate* sounds. Sounds are probably produced by the vibration of valve flaps. *First sound* during the auriculo-ventricular contraction, is due to vibration of the semilunar and closed auriculo-ventricular valves. Its duration is equal to the ventricular systole. *Second sound*, when the ventricles cease to contract and the aortic and pulmonary valves close. This is due to the vibration of the closed arterio-ventricular or sigmoid valves, and attends the beginning of the ventricular diastole. The sounds are weak in a weak heart; and also in fat persons and patients with pericardial effusions, and in emphysema. The *reduplicate* sounds are generally intermittent sounds, and have a close relation to respiration. The first sound reduplicates at the end of expiration and at the beginning of inspiration. The second at the beginning of expiration and at the end of inspiration, owing to the homologous valves, namely, the two cusps and the two sigmoids not being closed at precisely the same time. This may be due to some

Auscultation.  
sounds.

Systolic.

Seat.

Diastolic  
seat.

Reduplicate.

Cause.

Tone.

Reduplicate  
sounds.

Cause.

difference in the amount of pressure exerted upon the valves, this difference of pressure depending upon different states of respiration.

Normal contraction of the heart.

In the normal contraction of the heart the contraction of the auricles immediately precedes that of the ventricles; the systole of both ventricles is exactly synchronous; the impulse and ventricular systole exactly coincide both in time of occurrence and of duration; the second sound follows immediately the ventricular systole; and the auriculo-ventricular valves vibrate during the greater part of the ventricular systole.

Abnormal sounds or additions.

Friction sound.

Murmurs.

Observations.

Besides these natural sounds, in disease there may be abnormal additions. These, if caused outside the heart, are *friction sounds*. Every addition to the normal heart sound not a friction sound is called a *murmur*. Three observations must be made on every murmur to make it of use for diagnosis—its *time*, its *place* of *best hearing*, and the *direction* of its *transmission*.

Mitral regurgitation . . .	{ A systolic murmur, audible at apex, traced to the angle of left scapula.
Mitral obstruction . . .	{ A præsystolic, loudest at apex, not traced to angle of scapula.
Aortic regurgitation . . .	{ A diastolic, audible at base (second right cartilage), traced to the right side of sternum.
Aortic obstruction . . .	{ A systolic, audible at base (second right cartilage), traced along the aorta.

Other murmurs not due to valvular disease are heard; they are usually loudest at base, to the left of the sternum. Their cause is unknown, but is supposed to be some irregular movement of the blood in the heart, due to its im-

perfect quality; hence they are called anæmic or hæmic murmurs. Anæmic murmurs.

Murmurs may be caused by pressure of blood in the large vessels; they also occur without pressure in arteries, owing to tension, and in veins from an unknown cause. Of this character is the bruit-du-diable, heard in the neck. Causes.

### THE INTEGUMENTARY SYSTEM.

*Skin.*—In fever the skin is hot and dry. In hectic and in phthisis it is covered with colliquative sweats. In acute rheumatism there is profuse acid sweat. In extreme prostration the skin and the sweat are cold and clammy. In acute inflammations, as pneumonia, the skin is dry and harsh and acrid, without any soft supple feel. In diabetes it is dry and harsh. In the desquamative stage of scarlet fever, and to a much greater degree in ichthyosis, it is rough and scaly. Skin.

*Wasting of cutaneous fat* occurs in most chronic diseases, and in some of the more prolonged acute affections, as diarrhœa, dysentery. *Odour.*—In acute rheumatism, is acid and disagreeable, and like that of a sour poultice. During the maturation of smallpox pustules the skin is peculiarly greasy and disagreeable. In typhus fever, there is characteristic mousy odour. Emaciation.

*The colour of the skin* is yellow in jaundice, in bilious and yellow fevers. Pale and sallow in anæmia, chlorosis, cancer, or syncope. Purple, or blue, or dusky, in low continued fevers, morbus ceruleus, and collapse stage of cholera. A red colour of the skin of the ear on one side of the face after food is characteristic of dyspepsia. Bronze colour in diseases of the supra-renal capsules (Addison's disease). Redness of the skin, with burning, round the margins of the palms of the hands and soles of the feet, of indigestion or hectic fever. *The skin of the face.*—Is flushed in fever, and in congestion of the brain. It is purple or livid in low Colour.

Skin of face.



fevers, sallow in chlorosis, dyspepsia, and cancer, and almost black in asphyxia.

Œdema.

*Œdema of the skin.*—In kidney diseases and in advanced cases of heart disease the skin is generally œdematous. In local inflammations, œdema occurs in the neighbourhood of the inflamed parts. In debility the feet may swell at night, but the swelling has usually subsided on leaving the bed by morning; or does so after lying for some time in the horizontal posture with the feet raised. The skin has a peculiar marble-like feel in sclerema and in morphœa.

Scars.

*Scars*, besides indicating wounds or burns, may be due to rupia, to herpes zoster, to smallpox and chicken-pox. The scar of herpes zoster is to be observed on the side over an intercostal nerve; those of chicken-pox and smallpox are best seen on the face; of rupia on the back. Marks of leech bites, and of phlebotomy and of cupping may be of importance in the history of the case. Marks of vaccination should be looked for, and the scars of strumous abscesses are of particular importance; they are commonest in the neck.

Eruptions.

*Eruptions.*—In *chicken pox* (varicella) it is a pimply rash all over the body and face. It may be noted that one of two small scars usually remain to prove the disease.

Scarlet fever.

*Scarlet fever.*—A universal blush, or crimson-coloured patches first appearing on the body.

Smallpox.

*Smallpox.*—A number of elevated, hard, shot-like papules, with vesicles after a time, and later pustules and scabs, appear, first on the face, then over the whole body; it leaves permanent pits.

Measles.

*Measles.*—Raspberry-coloured rash, rapidly running out into crescentic-shaped patches first on the face.

Typhus fever.

*Typhus fever.*—Eruption is mottled and dusky-looking from the presence of subcutaneous rash. On the surface of the skin we find a number of mulberry-coloured spots, elevated and partially disappearing on pressure. Later on

they become petechial. It begins on the backs of the hands.

*Typhoid fever*.—Scattered rose-coloured, elevated, cuticular spots seen over the abdomen. Typhoid fever.

*Purpura*.—A number of red or claret-coloured spots of different sizes spread over the body. They mostly resemble a bruise, and also fade like a bruise, and are not affected by pressure. Purpura.

*Erysipelas*.—The skin is red, hot, and swollen, and the neighbouring lymphatic glands also swollen and tender. Erysipelas.

*Joints*.—Swelling of joints may be due to acute inflammation, as in rheumatism and gout; or to chronic disease, as in housemaid's knee. Redness and pain separate the several forms. Joints.

*Erythema nodosum*.—Red, oval, elevating bumps, varying from one to one and a half inch, found on the exterior surface of the leg; their long diameter corresponds to the long axis of the limb. Generally affect both limbs simultaneously. Erythema nodosum.

*Glandular enlargements* indicate remote or immediate disease. In case of cancer, the glands in the neck or axilla are swollen. In diseases of genital organs they are swollen in the groins, or in the leg of the side which is affected. The glands in the neck swell in affections of the mouth or throat, in scarlet fever, in diphtheria, and in local or mechanical irritations. In struma swollen glands in the neck, with a scar of previous suppuration, are characteristic. The salivary glands swell in poisoning by mercury. Glandular enlargements.

### THE TYPHOID STATE.

Typhoid state.

This state is common towards the fatal end of many diseases, and may exist from the first in a few affections. Its symptoms resemble those of the later stage of

- Causes.** typhus fever. The diseases in which we most commonly meet with this state are erysipelas, carbuncles, severe acute inflammations, as pneumonia, specific fevers, acute atrophy of the liver, and in Bright's disease, and all disorders in persons accustomed to habitual excess in alcohol.
- Symptoms.** The patient lies on his back, sinks to the bottom of the bed, and has a low muttering delirium, his face is shrunk and ghastly-looking, and he is unconscious of all around him. The *skin* is somewhat livid, shrivelled, cold, and covered with profuse, often foetid, sweat; the lips parched; the *tongue* brownish-black and contracted, with sordes about the teeth and gums. There is *difficulty of swallowing*, and he mutters in a hoarse inaudible voice; his respirations are shallow, and somewhat accelerated. The *pulse* is rapid, feeble, or even imperceptible. The bowels are irregular, and urine scanty, high-coloured, and full of urates; or there may be retention. *Bedsore*s are apt to form. If told loudly, he will half-open his eyes, and if urged for food will take a morsel or two, and soon fall in his own unconscious state. He picks at his bed-clothes, his limbs are tremulous, and often, in advanced cases, he passes his urine and fæces in bed without knowing it. Gradually stupor or coma supervenes. The *temperature* is generally below the natural heat, except when the condition is due to rheumatism; it then may rise as high as 110°.
- Pathology.** This state is to be explained pathologically as due to some *poisonous* matter in the blood. In local inflammations the morbid products are generated in the affected part, and thence carried into the general circulation. Some believe the poisonous matters are products of the disintegration of tissues into urea and the like, which accumulate in the blood and act as a poison. The latter hypothesis has been proved to be sometimes the fact from post-mortems in which urea has been found in excess in the blood.

## DEATH.

Death is one of the terminations of disease. Many specific fevers end in death from low typhoid symptoms superadded. In many exhausting diseases, as phthisis, or others due to excessive discharges, death results from *exhaustion* or *asthenia*, or from *syncope* or *collapse*. In diseases of the respiratory passages the commonest cause of death is *apnœa* or *asphyxia*. In renal diseases *uræmia* is the cause, in pyæmia the *putrid poison* in the blood, and in brain diseases *coma*. Thus death may be due to failure of nutrition and of circulation of the blood, to want of proper elimination of effete or excrementitious products, and to defective activity of the brain functions.

The *failure of nutrition* may be due to actual starvation, or to obstructive diseases of the œsophagus or stomach preventing food from entering the alimentary canal, or organic or to functional disorders of the stomach and bowels ; it may depend on diabetes or malignant disease, or on wasting discharges, or on fevers or any other condition where there is a great disproportion between waste and nutrition of the tissues of the body.

*Signs of the approach of death.*—Emaciation and weakness, and shiverings on the least exposure to cold. There is great debility, the patient is insensible to surrounding objects, lies listless and motionless with hands and face and feet cold, the pulse is barely perceptible, the breathing slow and laborious, and there may be involuntary passage of urine and fæces. The temperature is, as a rule, very low. In cholera and malignant fevers there is often rise of temperature, continuing for a time after death.

The *circulation is feeble*. The heart ceases to propel the blood, either from inability or from spasmodic contraction, or from compression of pericardial effusion, or from obstruc-



tion of one of its orifices by clots. The pulmonary arteries may be obstructed by thrombosis or embolism. In such cases death is sudden; patient falls forward insensible, and dies with a convulsion; or in rarer cases, the patient is cold, covered with sweat, pale and insensible, and soon convulsed, the pulse fails, and the respirations are feeble and gasping. The progress of coagulation may be slow, and the blood collects in the capillaries and veins, and leads to dropsy, hæmorrhagic infarctions, and local thrombosis, and the parts farthest removed from the heart may even become gangrenous.

Want of  
proper  
elimination  
of effete  
products.

*The cessation of the proper discharge of effete material and their consequent retention in the blood.*—Such poisons are carbonic acid, which should be evolved by the lungs, and urea and other nitrogenous products by the kidneys and bile. In cases of carbonic acid poisoning, death is said to occur by asphyxia or apnœa and precedes death in many cases; apnœa more often arises from diseases of the respiratory passages, from mechanical obstructions to respiration, from paralysis or spasms of respiratory muscles, and from deficient supply of pure air. These processes are best exemplified in cases of drowning. Dyspnœa is extreme and violent, soon followed by vertigo and unconsciousness. Convulsions occur, and in a few minutes all muscular actions cease. The heart continues to beat even after cessation of respiration. In suffocation the non-aërated blood is impelled into the vessels of the lung, and through the systemic vessels. Thus less blood reaches the right heart, and less is, therefore, propelled into the arteries, and consequently less passes into the veins. As a result the pulmonary veins and systemic arteries are comparatively empty. In slow cases the surface becomes livid and swollen, and superficial veins enlarged; the pulse quick, feeble, and intermittent, with great dyspnœa and anxiety. Gradually the patient becomes drowsy, comatose, and sinks. In poisoning by urea and other matters,

there is more or less anæmia, and dropsy, with deranged nervous functions, as evidenced by delirium, convulsions, and coma.

In failure of nervous functions, death occurs by coma. There is profound unconsciousness and stertorous breathing. Saliva and other secretions accumulate in passages and are not expelled, and patient dies asphyxiated. In many cases death is due to spasm or paralysis of the respiratory muscles or to apnoea. Thus, in epilepsy the spasm of the glottis, and in tetanus the spasm of the diaphragm, stops the breathing and causes death.

#### DIAGNOSIS.

*Diagnosis* is the determination from the symptoms, physical signs and history, of the nature of the disease in any given patient. It is essential to accurate diagnosis to pursue definite methods of examination; in short, always to take a case in the same way. Diagnosis.

Note the name and address of the patient; his age; and the nature of his occupation. The occupation of a patient may have an important bearing on his case. A few of the more important (from a medical point of view) occupations may be mentioned. Painters, plumbers, type foundrymen, pewterers, and workers in white lead factories, are all liable to lead poisoning; and in cases where this is not their chief disease, it may give an altogether peculiar aspect to the symptoms. Looking-glass makers (by the old process), thermometer makers, and other persons working in mercury, are liable to be poisoned by it. Makers of artificial flowers and of coloured paper suffer from their contact with arsenic, and exhibit external ulcerations and internal pains, which might seem inexplicable if their occupations were not considered. Knife and fork grinders are subject to a peculiar form of wasting, due to lung disease, caused by the chronic irritation of the Casetaking.

bronchi set up by the fine hard dust of their occupation. The same, in a less degree, is true of miners and furriers, and cotton sifters. Soldiers are peculiarly liable to aortic aneurysm. Shoemakers, from their confining occupation, and probably also in a less degree from the pressure of the shoe last, are dyspeptic. Plethora affects butchers, though this is due of course to their diet rather than to their actual work. Cow-pock affects dairymen. Factory hands are anæmic. The occupation of the weaver is peculiarly liable to produce a long continuing weakness of indigestion and anæmia. The descendants of the French weavers, who settled in London in the reign of Queen Elizabeth and in the succeeding century, may still be recognised by their pallid complexions. Singers and clergymen are liable to chronic affections of the larynx and pharynx.

**Position.** *The position* must next be noted. The most startling of morbid positions are those induced by tetanus; opisthotonos, emprosthotonos, &c. In fevers the patient lies flat, and in diseases of the chest either on the affected side or on the sound side, or he may be seen in a sitting posture, propped up in bed and panting for breath. In cardiac and aortic affections he usually leans forward. In abdominal affections the knees are drawn up. In diseases of the eyes the head is turned from the light. The rickety child throws off the clothes and lies with its limbs exposed. The patient with ague is covered up to his nose. Great emaciation suggests a chronic disease, or that there has been a high temperature for some time in an acute attack.

**General appearance.** The skin is yellow in jaundice, soft and perspiring in fevers, and dry and harsh in kidney diseases and diabetes.

**State of skin.** *The condition of the features and the general appearance* may denote palsy, or the reverse, tetanus. A peculiar thin and pinched expression, called facies Hippocratica, indicates the near approach of death.

**Face.** *The cause* should be carefully investigated, and such

**Cause.**

points noted as any history of predisposition, or of exposure to cold, or whether the disease commenced suddenly or gradually, whether it is a sequel of some other malady, or is in itself a primary affection. The condition of physical and mental functions, and the symptoms and physical signs of the disease, the state of the pulse, the number of respirations, the condition of the tongue, the the appetite for food, the state of secretions, and the temperature of the body must be recorded.

The history of any case ought to be carefully investigated, and the patient's account of his symptoms and of how each began, carefully sifted. The imagination of a patient frequently adds to his conception of the gravity of the symptoms, but such exaggerations usually represent a something in the case, though often something wholly different from the patient's conception. It may be laid down as a good general rule that it is never safe to cast aside as ridiculous any statement of a sane patient. After the personal history the family history should in every case be investigated. It is never without a bearing on either diagnosis or prognosis, but it usually affects both. Diagnosis implies a complete, exact, and comprehensive knowledge of the case under consideration. When most satisfactory it determines the precise nature of the disease : in other cases it only gets so far as to decide that one of several diseases is present. Or it may determine that there is no disease, and that the patient is a malingerer. *History.*  
*Personal.*

Lov-  
lace, in Richardson's famous novel of 'Clarissa Harlowe,' endeavours to work upon the feelings of the heroine by lying in bed and seeming to bring up a pint of blood. A careful attendant would have examined the blood microscopically, and known at once that the disease was a fraud when he saw that the blood corpuscles were oval. *Family.*

A case often seen, in which it is very difficult to form a diagnosis, is that of a woman all whose friends believe her *Accurate diagnosis.*



to suffer from long-continued obscure disease. She looks very well, but after a short railway journey or a drive of a few miles needs to have some refreshment at once, and then to lie down for two hours. A summer's day has reduced her to the verge of fainting. She lies in bed for a week after a single disturbed night. The inhalation of a little tobacco smoke produces dyspnoea and cough, which makes her friends anxious about her life. She needs frequent change of climate, and would die if detained here or there. She is wholly unable to discharge the duties of any station. It is in such cases that the value of a systematic method of proceeding to a diagnosis becomes apparent. The physician goes slowly over each point in order, omitting nothing, repeating, it may be, his observations several times, and thus at last comes to the irrefragable conclusion that the patient who, after a supposed illness of a dozen years or more, and has no wasting of tissues, no rise of temperature, and no sign of disease of the heart, lungs, or other organ. is suffering from the common moral defect of extreme self-indulgence, and from no disease in the list of the College of Physicians.

### PROGNOSIS.

#### Prognosis.

*Prognosis* is the determination of the probable event, and is a conclusion depending in part on the diagnosis, but of course liable to change, without corresponding alteration in diagnosis. To form a correct prognosis of disease is one of the most difficult tasks in the practice of medicine. Prognosis determines the probable result of a disease and its duration; and more minutely whether it will end in death, complete recovery, or imperfect recovery, with impairment of health or of any special function of the body. In the case of a disease likely to end fatally, prognosis determines whether it will end suddenly or slowly, and whether by syncope, asphyxia, or coma. This knowledge can best be acquired by a long

course of study of disease in all its forms and complications, and by a careful consideration of the history and individual peculiarities of the case. It is above all, necessary to avoid prejudice, and the idea that this or that removes the case from the necessity of further thought, and that it is absolutely hopeless or perfectly certain to turn out trivial. Errors in prognosis most often arise from trusting too much to loose general principles, and from considering one symptom, and not all the symptoms. In order to form a correct prognosis, it is the physician's duty to collect and compare the therapeutical experience of competent men, and to draw his conclusions from data recorded by them, and from his own previous experience. The remarks of Hippocrates, though more than two thousand years old, are felt to be true by every practitioner of our own time.

“The best physician appears to me to be he who knows how to know in advance. By ascertaining and explaining before the sick the present, past, and future of their diseases, and by completing the history when they have left anything out, he will gain their confidence, and convinced of the superiority of his intelligence, they will not hesitate to trust themselves to his care.”

### COMPLICATIONS.

Most diseases have a distinct course, which may be definite or indefinite, prolonged or interrupted. This of course depends upon a distinct series of pathological changes, regularly succeeding one another. When the series of changes is interrupted, or when it runs parallel with other changes, a *complication* is said to occur, and particular complications have a tendency to occur in particular diseases. Thus, sore throat is almost an invariable complication of scarlatina; bronchitis, of measles; herpes, of acute pneumonia.

Complications.

*Sequelæ*.—The morbid changes which produce disease

Sequelæ.

may altogether pass away and be replaced by a healthy condition of the organization, or they may be succeeded by other morbid conditions dependent upon the state to which the first series has reduced the organization. Such further dependent changes or diseases due to diseases are called *sequelæ*, and peculiar *sequelæ* occur in the same way as peculiar complications. Thus otitis interna is a sequel to be expected after scarlet fever; otorrhœa a sequel of measles. The term *sequelæ* is sometimes loosely used to express actual results of the primary disease, though that may have ended and no other come on. Thus pigeon breast is spoken of as a sequel of whooping-cough, but is really a mechanical effect of the whooping-cough, and is not due to any secondary disease.

#### TREATMENT.

##### Treatment.

Treatment is the practice of the science of therapeutics, which teaches us how to cure, relieve, or prevent diseases. A laborious attention to minute details is essential to successful treatment.

The practitioner should avoid falling into the danger of routine mode of treating diseases. He has to consider each case on its own merits, and to bring his knowledge and observation to bear upon the nature of the case, and to use his discretion and common sense in varying or modifying the treatment to be adopted by the method indicated by the known course of the disease. But in cases where death is inevitable, we must try to prolong life, or make the condition of the patient as comfortable as possible for the short space of his existence. We have thus to attempt to remove the causes of disease, to relieve its symptoms, and to prevent its further progress. Attention must also be paid to the general health of the individual, and to the warding off of possible complications. If the various maladies are constitutional disorders they

must be carefully rooted out from the members of a family ; if of a contagious nature, they must be eradicated from the midst of communities. The methods of treatment include therapeutics and general hygiene. By *therapeutics* is meant the administration of medicines, either by the mouth, by subcutaneous injection, by means of baths, by inunctions, by enemata, or by inhalations. *General hygiene* implies a careful attention to the diet as regards the nature of the food and drink, to its total quantity and quality at a given time, and to the interval at which each meal should be taken. It includes the use of alcoholic stimulants, which should never be employed in an off-hand way. General hygiene has an important influence in the treatment of diseases, and for this purpose various methods connected with it should be considered, such as the place of residence, habits of life, occupation, exercise, change of air and climate.

Methods.

Therapeutics.  
Hygiene.



## DERANGEMENTS OF THE BLOOD.

Blood de-  
rangements.

Any deviation from the healthy condition of blood gives rise to diseases. Blood is liable to be deranged by—

1. A disproportion in the amount of its constituents.
2. The introduction of poisons from without.
3. The retention of effete products or of poisons absorbed from the body.

Sources of  
blood.

The blood receives its several constituents from three different sources—1. Atmospheric air from the air cells of the lungs. 2. Food (primary digestion) through the alimentary canal and lymphatic system. 3. Metamorphosis of tissues.

Use of blood

Blood is useful in forming materials which build up tissues, form secretions, and produce excretions. Its constituents are—

Constituents.

Water	.	.	.	784	parts in 1000
Albumen	.	.	.	70	„ „
Organic salts	.	.	.	3·6	„ „
Fibrin in solution	.	.	.	2·2	„ „
Red corpuscles	.	.	.	130	„ „

Characters.

*Characters.*—It is an albuminous fluid, consisting of a transparent yellowish liquid, called liquor sanguinis, and many red and a few white larger corpuscles. The liquor sanguinis is made up of serum holding fibrin in solution. The specific gravity of blood is 1055; the temperature 98·4°; the reaction alkaline. The quantity of blood in the body is to the weight of the body as one to five. The quality or composition of the blood is liable to changes. The *specific gravity* is reduced in anæmia, albuminuria, scurvy, and gout. It is increased in plethora and in diseases attended with copious watery discharges, as cholera and diabetes. When

Sp. gr.  
Temperature.  
Reaction.  
Quantity.Alterations  
in the quality  
of blood.

the *red corpuscles* are in excess, as in plethora (polycythemia), all the vital functions of the organs and tissues of the body become accelerated, and persons so affected are very apt to suffer from active hæmorrhages. They are deficient in anæmia, in those who are ill-fed, who confine themselves in close, dark, and ill-ventilated rooms, who breathe impure air or suffer from exhausting diseases, or expose themselves to the influence of malarial and other poisons. They are also diminished in number in leucæmia, where the white corpuscles are relatively and absolutely increased. *White corpuscles* are abundant in leucæmia, although the red corpuscles may be proportionately diminished. The relative number of the corpuscles in a specimen of blood may be thus accurately estimated: a measured drop of blood is mixed with a given quantity of a saline solution, and placed on a microscope slide with a ruled scale. The number of corpuscles in each square of the scale can easily be counted and compared with the numbers given in normal blood, estimated by the same method.

Red corpuscles.

White corpuscles.

The quantity of *fibrin* is increased in persons who are well fed and during their growth and development. It is also increased in inflammatory diseases, in acute rheumatism, during pregnancy, and in chlorosis; but is diminished in adynamic fevers, in hæmorrhages, in scurvy, and in cases of death by asphyxia. In all such cases fibrin is unusually watery and very imperfectly coagulable; its quantity is as low as 1 part in 1000. *Albumen* is in excess in fevers, acute rheumatism, pleurisy, tubercular diseases, chlorosis, and apoplexy; and is defective in kidney diseases. *Water* is extremely reduced in quantity in cholera, and is greatly in excess in dropsies and fluxes. *Uric acid* is in excess in gout, *biliary matter* in jaundice, *urea* in kidney diseases, and *sugar* in diabetes.

Fibrin.

Albumen.

Water.

Uric acid.

*Foreign matters* may be present in the body. They are

Foreign matters.

solid, liquid, and gaseous. Liquids are excreted by the liver, skin, and kidneys, but retained in the blood. Solids are introduced along with the food. Gases are admitted through the respiratory organs or through the skin. The poison of smallpox and of other fevers is thus introduced into the blood.

Alterations  
in the  
absolute  
quantity.

Plethora and anæmia are changes in the absolute quantity of blood.

#### PLETHORA.

Plethora.  
Definition.

In this affection the quantity of the blood is too great, and the relative proportion of red corpuscles to white is augmented, the fibrin is unaltered or shows a slight increase, and the water is rather diminished in quantity. Plethoric persons are liable to suffer from hæmorrhages, fevers, palpitation of the heart, and dyspnœa upon slight exertion. The animal heat and all the functions of the body are increased in activity.

Cause.

*Cause.*—A tendency to plethora is constitutional, but the condition may be acquired from continued over-feeding.

Symptoms.

*Symptoms.*—The face looks full and turgid, with a purplish tinge; the eyes small and moist, but often prominent; the lips and mucous membrane florid; the pulse large, hard, and resisting; the superficial veins turgid. A feeling of dulness and desire for sleep, with snoring, are induced; vertigo, headache, constipation, and hæmorrhages from the nose, or from piles, are very common.

Treatment.

*Treatment.*—Plethora, actual or probable, was one of the chief apprehensions of the old physicians, and they had constant recourse to venesection to avert it, a practice surviving in the popular usage of India. In old or young, if the veins seem too full of blood, let it out there and then is the advice given in the *Flos Medicinæ* of the school of Salernum, which was for centuries the text-book in hygiene of every nation of Europe. The modern practice is to resort but seldom to venesection, and we probably err in the

opposite extreme. That many cases might be advantageously treated by phlebotomy is shown by the great relief experienced by plethoric persons after a violent natural hæmorrhage as epistaxis. Purgatives, and especially saline purgatives, regularly administered, are essential in the treatment of plethora. A moderate diet, and abstinence from all alcoholic drinks, active exercise, and avoidance of too long hours of sleep, or in Europe of sleep in the day-time, are to be enjoined.

### ANÆMIA.

Anæmia signifies deficient blood. The blood is thin in quality and poor in quantity. Red corpuscles are diminished from 130 per 1000 to 50 or 60. Liqueur sanguinis contains less albumen and more salts.

Anæmia.  
Definition.

*Causes.*—Those conditions which retard or prevent the formation of healthy blood, give rise to anæmia: as impure air; dark and ill-ventilated rooms; scanty clothing; serous chronic discharges acting as a gradual drain upon the system, as in piles or in protracted diarrhœa; hæmorrhage due to disease or injury; profuse watery or albuminous discharges, as in cholera; long-continued exposure to malaria or other poisons; or the use of poisonous drugs, as mercury, antimony, and lead, for a long period; acute fevers; venereal and other excesses; very variable atmosphere. It is common in persons residing within the tropics. Females are more subject to it than males.

Causes.

*Symptoms.*—The face is pale, sallow, or emaciated; skin waxy-looking and pallid, often also puffy and bloated about the eyelids and ankles; superficial veins prominent; sclerotic, bluish and clear. The gums, lips, and tongue are pale and flabby, and the digestive functions much deranged. The secretions are generally scanty. Hæmorrhages from the stomach and bowels sometimes occur. The pulse is small and feeble, and the extremities cold. There is lan-

Symptoms.



guor, lassitude, and incapacity to work, faintness, breathlessness, and palpitations of the heart, and tendency to syncope.

Physical  
signs.

*Physical signs.*—Systolic murmur best heard at the left base; a loud bellowing murmur and a thrill in the course of the subclavian arteries; and a humming or whistling sound (the bruit-du-diable) heard at the root of the neck, are physical signs believed to be due to the changed condition of the blood. The arteries in the neck beat violently.

Termina-  
tions.

If anæmia continues for a very long time, general atrophy of the secreting glands sets in, with diarrhœa or profuse sweating, or general anasarca, and now and then great dyspnoea. Painful spasms, and even convulsions may occur. If death takes place it is by syncope or by coma.

### CHLOROSIS.

Chlorosis.  
Definition.

*Chlorosis*, otherwise called green sickness, is a peculiar derangement, noticeable in young and often pretty but anæmic girls about puberty, and is due to some chemical change in the blood-pigments. The red corpuscles are pale, small and diminished in number; and the serum is in excess.

Symptoms.

Disordered menstruation, leucorrhœa, and other sexual derangements, are common. The nervous system, the circulatory, and the muscular system also suffer. The patient wears a yellowish, waxy, or greenish look, and has a dark halo round the eyes; she suffers from derangement of the stomach and from constipated bowels, with abundant limpid urine, gastric dyspepsia, and pain under the lower ribs. The liver is inactive and the breath offensive; the pulse is small, frequent, and weak; the skin œdematous; the mucous membrane puffy and flabby; the tongue indented by the teeth; the gums spongy and pale. Palpitation, with cardiac murmurs, is common. There is often a slight elevation of temperature which no doubt gave rise to the old term for chloroses, *Febris Alba Virginum*.

Physical  
signs.

*Treatment.*—The most important point is to attend to Treatment. hygienic conditions. Careful nursing, fresh air, good light, out-door exercise, dry and bracing climate, sea bathing, and early hours, are important. The food should be nutritious and simple. Wine, beer, milk, and broth, may be taken daily and repeatedly. Proper clothing and rest are very desirable. The various preparations of iron; the concentrated essence prepared from game birds, which is well known in India; vegetable tonics; calf's-foot jelly; egg mixture every morning; may all be continuously given with good effect. Regular and sufficient menstruation should be established, and the bowels must never be allowed to become loaded.

## LEUKÆMIA.

*Leukæmia* is a morbid state of the blood, in which the Leucocy-  
thæmia.  
Definition. white corpuscles are in excess and the red corpuscles proportionately and absolutely diminished in number. It is a disease of adult or advanced life. The spleen or the lymphatic glands, or both, are enlarged. Cause.

*Pathology.*—Leukæmic blood freed from fibrin looks pale, Pathology.  
Blood in  
Leukæmia. from its containing a large number of white corpuscles; the red corpuscles are few and always sink to the bottom. If the blood be shaken with ether it retains its white colour, not so if it only contained chyle corpuscles. Under the microscope we find the whole field covered with white corpuscles, with here and there rows of red corpuscles. The relative proportion of red to white corpuscles is enormously diminished, during health its proportion being 370 to 1. In this disease it is reduced to 3 to 1. The red and white blood corpuscles may be looked on as a kind of secretion from the lymphatic glands, which secretion passing into the circulation becomes coloured by exposure to the oxygen of the air in the lungs. In Lymphatic  
glands. leukæmia, the lymphatic glands, viz. the supra-renal and

spleen, become hypertrophied; their cell elements become multiplied and find their way into the blood, thus increasing the number of colourless cells. Thus, the weight of the spleen may be increased from the ordinary 5 oz. to 9 lbs. Its volume is also augmented, its consistence is abnormally firm, its tissues thick and opaque, and its vessels enlarged and increased in number. Hæmorrhagic infarctions are sometimes seen within it.

**Symptoms.** *Symptoms.*—Pallor of the face; general and progressive emaciation disordered respiration swelling of the abdomen exhausting discharges as diarrhœa; repeated attacks of epistaxis, other hæmorrhages, and dropsy and enlargement of the liver and spleen are the chief symptoms. The enlargement of the spleen may be very great, so that it often occupies one half or more of the left side of the abdomen, even reaching to the spine behind, and to the crest of the ilium. In advanced cases there is œdema of the feet and ankles, and effusion of fluid into the serous cavities. Death takes place from asthenia, often preceded by delirium, stupor, or coma, or from exhaustion due to hæmorrhages and diarrhœa. The proportion of uric acid to urea in the urine is increased. In health its proportion is from 20 to 1. In this disease it is about 1 to 20.

**Termination.** *Treatment.*—The disease is usually fatal, but transfusion, tonics, good animal food, and blood restoratives prolong life for a considerable time.

## DIABETES.

**Diabetes.**  
**Definition**

*Diabetes* (glycosuria, saccharine diabetes, diabetes mellitus, honeyed or sweet urine) is a chronic disease of which the local cause is as yet undetermined. In this derangement there is found less sugar than normal in the blood and a large quantity of urine is secreted, which contains grape sugar. In diabetes the urine continuously contains sugar, and a very large quantity is passed each day. Wasting, and a variety

of serious and other grave constitutional symptoms, with a variety of complications, accompany this abnormal secretion.

*Causes.*—Diabetes may occur at almost any age. It is particularly rapid in the young, may sometimes be checked in middle life, and is not often fatal, though of common occurrence after sixty. The cause is generally obscure, but that it has some relation in many cases to continued mental anxiety is probable. In others it seems an alternative of a phthisical diathesis. Causes.

*Pathology.*—During health an amyloid ferment, called glycogen, or hepatic dextrine or starch, is formed in the liver, and this being acted upon by a peculiar ferment already existing in the blood, becomes converted into sugar. During health sugar so produced passes into the hepatic veins and through the inferior vena cava up into the lungs, where it is consumed. In diabetes this function becomes deranged, either because the quantity of sugar produced by the liver is too large, or because the lungs are not able to destroy the whole amount produced. A part is therefore excreted by the kidneys. Thus, in diabetes we have either an increased production of sugar or the diminished destruction of the quantity normally produced. In the absence of visible changes the floor of the fourth ventricle and the cervical ganglia of the sympathetic have been considered the true seat of the lesion in diabetes. Pathology.

*Post-mortem appearances.*—There are no constant post-mortem appearances except those of the wasting and the complications. Post-mortem appearances.

*Symptoms.*—The increase in the quantity of urine, and particularly in the number of times he is obliged to void it, is the first symptom noticed by a patient with diabetes. He is obliged to get up at night several times to empty his bladder. Such frequent micturition might be due to mere cold or to an enlarged prostate, but the characters of the urine establish the diagnosis. Diabetic urine is of a Symptoms.

Urine.



Characters. pale straw colour, and of a faint apple-like odour. Its quantity varies from eight to thirty pints in twenty-four hours. Its specific gravity 1030 to 1060, but may be less if albumen be present. It is generally of an irritating nature and consequently often causes heat and burning along the urethra. When kept in a warm place it ferments rapidly, deposits a sediment, and forms torulæ.

Chemical tests.

*Chemical tests: the fungus test.*—Allow the urine to stand for a few days and there is developed the sugar

Fungus test.  
Moore's test.

fungus (*Torula cerevisiæ*). *Moore's test* (potash test).—Add to the urine half its volume of liquor potassæ and boil it for a few minutes; it will assume a dark brown

Copper test.

colour, from its conversion into molassic acid. *Copper test.*—A drop of the solution of the sulphate of copper added to the boiling urine gives a yellowish precipitate of suboxide of copper, the peroxide being reduced to a suboxide.

Robert's test.

*Robert's test.*—Take eight grains of sulphate of copper, thirty grains of cream of tartar, one ounce of liquor potassæ. Boil the solution and add a few drops of urine; the mixture will at once become intensely opaque yellow, and in a short time there will be a deposit of abundant sediment of suboxide of copper.

Trommer's test.

*Trommer's test.*—Add a drop or two of the solution of sulphate of copper to the urine till it assumes a blue tint, then add half the quantity of liquor potassæ, and a pale blue precipitate will be deposited of hydrated oxide of copper; if there be sugar the precipitate will be redissolved into a purplish blue solution. If heated to boiling point, a yellowish brown precipitate of suboxide will appear.

Fermentation test.

*Fermentation test.*—Add a few drops of yeast to a tube chock full of urine, set it aside for from eight to twelve hours; the urine will ferment and be converted into carbonic acid and alcohol. Carbonic acid will appear in bubbles.

*Robert's test for quantity.*—Ascertain the specific gravity before and after the fermentation, and from loss of density by its conversion into carbonic acid and alcohol calculate the amount of sugar destroyed. Thus :

Sp. gr. before fermentation . .	1050
Sp. gr. after fermentation . .	1010
	<hr/>
	0040

Robert's  
quantitative  
test.

The proportion is of one grain of sugar in every degree lost, and therefore the quantity is forty grains of sugar.

A neat method of determining the quantity is by means of the spectroscope. The urine is rendered colourless by filtering through charcoal. A ray of light from a prism is passed through it, and is deflected by the saccharine solution to the right. The number of turns of the screw required to place the prism so as to make the ray of light straight is an accurate index of the quantity of sugar (method of testing the quantity of sugar in trade).

Spectroscope.

The chief symptoms which accompany this excessive discharge of abnormal urine are the following :

Symptoms.

The skin is harsh, scurfy, and dry, the countenance distressed and worn out, the muscular weakness, associated with general wasting of all the tissues, gradually increases and there is loss of sexual power. As the case progresses we find cold extremities, hectic towards evening ; sometimes the temperature is markedly reduced, with shrinking of the frame, rapid diminution in the weight, feeling of uneasiness, and indisposition to work. The appetite is enormous, but the digestion becomes deranged ; the mouth is foul and dry ; gums red, tender, and swollen ; tongue peculiarly red and irritable, or clean and crooked, and dry, sometimes moist and furred. The breath is of a sweet odour, and there are dyspeptic symptoms, with fulness at the epigastrium, flatulence, gaseous and acid eructations. The disease is often slow and insidious in its progress, or may end in

Termination.

about two years. The younger the patient the more rapid is its progress.

It is said that the cause of the cataracts, which are always soft, is that the sugar is imbibed by the optic lens.

Prognosis.

*Prognosis.*—The younger the patient the less is the chance of recovery. It may occur if the lungs are sound, the urine without albumen, the teeth healthy, the skin moist, and if the effects of treatment and diet are seen in a marked diminution in the quantity and specific gravity of the urine, in increase in weight and strength of the body, and in diminished thirst and appetite. Old people often have some degree of diabetes for years. A sudden cessation of the excretion of sugar indicates the near approach of death. When rapid wasting diarrhoea and brain symptoms are present, patients are liable to sink suddenly. In all young people and at all ages when phthisis or albuminuria is a complication, the prognosis is unfavorable.

Diagnosis.

*Diagnosis.*—Sugar may be present in the urine without true diabetes. Thus, in disturbance or injury of the nervous system, in chronic bronchitis, in gout, and in carbuncle, sugar may be present without any other symptom characteristic of diabetes. Great thirst, increased secretion of urine, and emaciation, and large appetite, indicate that the case was one of true diabetes.

Diabetes insipidus.

*Diabetes insipidus.*—This condition occurs in old weakly people, and occasionally in children; there is no sugar in the urine, but the quantity of water is large. It is of a very low specific gravity, very pale in colour. There is no excessive thirst, no dry skin, and no emaciation. Many cases formerly described as diabetes insipidus are now known to be examples of chronic Bright's disease with granular kidney.

Complications.

*Complications.*—Diabetes mellitus is often associated with pulmonary consumption. Boils and carbuncles and

cataracts are common accompaniments, and Bright's disease may be present. Œdema of the feet without albuminuria occurs, as in all cases of extreme debility.

*Treatment.*—Regulation of the diet is the most important point ; all food containing starch or sugar must be forbidden. Animal food, game, and poultry, are highly beneficial. Bran cake and biscuits, almond biscuits, and eggs, are admissible ; as also are many vegetables, such as cabbage, cauliflower, celery, and mustard. Milk and lime water, or diluted phosphoric acid, are good drinks. Cream-skimmed milk can be given in any quantity, as the sugar in the milk does not undergo glucose transformation. Alcohol free from sugar, as dry sherry, claret, or whisky, may be used in moderation. Warm clothing, warm baths, sea baths, and change to the sea side are most useful. Opium, alkaline carbonates, arsenic, iodine, bromide of potassium, have been tried, and most of them with indifferent success. Opium does certainly check for a time the excretion in most cases. Its tendency to increase the constipation which usually exists ought to be counteracted by purgatives. Digestion must be carefully attended to. For sleeplessness sedatives, such as codeia, and hyoscyamus are useful.

Treatment.

Hygiene.

Drugs.

### SCURVY.

Scurvy is an affection common in seafaring people, said to be due to long-continued privation of fresh succulent vegetables or fruits ; severe cold, fatigue, and exposure, seem to favour its development. It has been observed in a modified form among sempstresses and other people whose earnings are small, and whose diet chiefly consists of bread and tea. To this variety the term land scurvy has been applied.

Scurvy.

Causes.

*Pathology.*—Its *pathology* is based on the hypothesis that it is caused by a deficiency of alkalies in the blood.

Pathology.

*Symptoms.*—The disease sets in with languor and de-

Symptoms.



pressed spirits. The skin generally, or the face in particular, soon assumes a dusky hue; the gums become swollen, spongy, and livid, the teeth become loose in their sockets, and the breath is offensive. Hæmorrhage from mucous surfaces is apt to follow. Palpitation of the heart and dyspnoea may be present. Petechial spots appear on the legs, and the muscles feel hard and swollen from fibrinous deposits. Diarrhoea and even dysentery often come on. Dropsy may occur. Death is due to thrombosis or to general exhaustion. Whole ships' crews have died of scurvy, and the disease is sure to end in death, if proper articles of diet are not procured.

*Diagnosis.*—Scurvy may be mistaken for purpura. Extravasation from the skin and mucous membrane is common in both, but purpura is unaccompanied by any affection of the mouth, and in purpura there is no peculiar subcutaneous or intermuscular infiltration, nor any hæmorrhagic inflammation of serous membranes.

*Treatment.*—A diet of fresh vegetables and fresh meat is essential for cure. Astringent washes for the gums are only useful locally. Lime-juice regularly administered prevents the onset of scurvy where fresh vegetables cannot be obtained.

#### BERIBERI.

*Beriberi.* Almost allied to scurvy is an affection known as beriberi. In *beriberi* there is scurvy from the first; there is also general dropsy. The blood is deficient in salts and other solid ingredients. There is marked anæmia, accompanied by stiffness or numbness of the lower extremities, which in rare cases is succeeded by paralysis. The connective tissue of the muscles and of the solid and other organs of the body is bathed with fluid. In fully developed cases the patient suffers from great dyspnoea, oppression at the epigastrium, inability to walk, and vomiting of blood. The urine is scanty, high coloured,

and often suppressed. The pulse is intermitting, weak and fluttering, and there is palpitation of the heart. Its Duration. *duration* varies from a few days to several weeks. Death takes place from embolism.

The *post-mortem appearances* are serous effusions in various parts of the body, with enlargement of the liver and spleen. Post-mortem appearances.

*Prognosis.*—Cases of beriberi rarely recover. Prognosis

*Treatment.*—For the dropsy drastic purgatives and diuretics are serviceable. The vapour or hot air bath is also useful in promoting the action of the skin. Treatment.

### CYANOSIS.

Cyanosis, or morbus cœruleus, is a condition of the blood in which, owing to defective aëration, the general colour of the blood, as seen through the skin, is bluish instead of the natural hue. Its common cause is congenital malformation of the heart, under which disease a full account will be found. Cyanosis.

### SPECIFIC BLOOD POISONS.

The poison may be retained in the blood, owing to the failure of the function of an organ.

### EMBOLUS.

Embolus (from *embolon*, a plug) is a solid mass carried along in the blood, and is very often a piece of a thrombus from the interior of the heart or of some vessel. It goes along in the circulation till it reaches a vessel, the calibre of which is too small to allow it to pass through, and in which it therefore becomes impacted, giving rise to symptoms varying with the organ attacked. As, however, thrombus is only one of the sources of embolus, and as the others are intimately associated with cardiac disease, a fuller account of the pathological effects and of the symptoms due to embolus will be found in that part of the book. Embolism.  
History.

## THROMBOSIS.

- Thrombosis.** Thrombus signifies a clot of blood, and is a fibrinous clot partially or completely closing the vessel by the morbid product developed at the seat of obstruction.
- Cause.** Thrombosis is most common in debilitated persons, or in those prostrated by such diseases as croup, diphtheria, scarlet fever. Its *seat*: in the heart, may be the right auricles, the edges of the valves, the muscular and tendinous cords of the ventricles or the muscoli pectinati. Thrombosis also occurs where the veins are diseased, varicose, or inflamed, or when the blood is easily coagulable, or the circulation languid.
- Symptoms.** A clot in the right side of the heart prevents the return of blood from the systemic veins. It also impedes the aëration of blood into the lungs. Thus the action of the heart becomes very irregular and hurried, and the pulse extremely weak and small. The patient suffers from great
- Termination.** restlessness, anxiety, and dyspnœa. Death often results from pulmonary obstruction. It is to be observed that the term thrombus is applied to a stationary clot, that of embolus to one which has travelled away from its place of origin.

## URÆMIA.

- Uræmia.** Retention of urea in the blood occurs, and is due
- Definition.** to the failure of the functions of the kidneys, urea not being eliminated. During health the quantity of urea excreted in twenty-four hours weighs about one ounce or 493 grains, that of uric acid being only from four to eight grains. This quantity varies with habits, exercise, and age. Thus it increases in the prime of life, but is less in the young and in old age. The quantity is increased on muscular exertion, in acute and inflammatory diseases, and in those who indulge largely in animal food. It is diminished in chronic diseases, in cases where nutrition is interfered with, in some convulsions, in paralysis, in

various fatal diseases, especially towards their close, and in Bright's disease.

*Pathology.*—There are two theories about uræmic poisoning. 1. Urea is not secreted, it being retained in the blood. 2. The urea is secreted by the kidneys, but is re-absorbed into the blood and converted into carbonate of ammonia, through some unknown fermentation. Some maintain that urea is not so converted into carbonate of ammonia, but that instead of being, as usually, excreted by the kidneys it is excreted by the intestinal mucous membrane, and is there decomposed and thence absorbed as ammonia into the blood. Pathology.

*Causes.*—Structural disease, or extreme congestion of the kidneys, are its causes. Causes.

*Symptoms.*—The chief symptom of uræmic poisoning is a violent disturbance of the nervous system; a state of partial stupor, followed by complete coma, stertorous breathing, and clonic spasms. There are often no premonitory symptoms of the fit but headache, a highly ammoniacal state of breath, dimness of vision, rigors, vomiting, diarrhœa, glazed tongue and a very sallow countenance, may indicate its approach in a dropsical patient. Suppression or retention of urine is always present. The attack may be altogether unexpected, coming on in a person whose symptoms have never been such as to lead to the examination of the urine. Thus, a physician to St. Bartholomew's Hospital was seized with a uræmic convulsion as he was paying his usual visit in the wards. Symptoms.

*Diagnosis.*—The fit in all its features but one resembles that of epilepsy. The difference is that in a uræmic fit the face is at no time livid, but is pale throughout. Diagnosis.

*Treatment.*—All that can be done during the fit is to keep the patient in bed, and to open his bowels by enemata. Wet packing and bleeding from the arm will sometimes avert a suspected attack. Treatment.



## PYÆMIA.

Pyæmia.

Definition.

*Pyæmia* (ichorhæmia or septicæmia) is a morbid state of the blood and of the general system, and is due to the absorption of some putrid poison in the blood. When the disease only leads to febrile disturbance, and no further consequence, it is known as septicæmia; but when, as a further consequence, it leads to the formation of abscesses in different parts of the body, it is called pyæmia.

Pathology.

*Pathology.*—In some cases the blood is so deeply saturated with the poison that death occurs before any of its local symptoms manifest themselves. In some cases the poison acts either upon the liver or upon the intestines, and gives rise to the excretion of large quantities of dark bile, or to severe diarrhœa or dysentery. In a few cases the poison affects the serous membranes, as the pleura, pericardium, or peritoneum. It may also affect the skin, and thus give rise to carbuncles, boils, and erysipelas. It also leads to secondary abscesses, as in the lungs, liver, brain, or other locality.

Causes.

*Causes.*—Pyæmia may be due to some injury or wound, which assumes an unhealthy action, and thus leads to the introduction of putrid matter into the blood. Its cause is often obscure, but a minute search will always reveal a source of poison. Abscesses of the internal ear are often its origin in children.

Symptoms.

*Symptoms.*—The disease sets in with a severe rigor, or with convulsions, followed by great heat of the skin, frequent pulse, and copious sweats. There is a sudden rise of temperature from  $98^{\circ}$  to  $105^{\circ}$  on the first day of the attack, and it is accompanied with great prostration of body and mind, with extreme restlessness, often vomiting and diarrhœa, dyspnœa, and low muttering delirium; a peculiar sweet odour is perceptible in the breath and all over the body. The urine is high coloured, scanty, and contains but

small quantities of chlorides. With these conditions typhoid symptoms also set in rapidly. The disease may assume a chronic form, repeated crops of abscesses appearing. In such cases death from exhaustion is the usual result, but recovery may occur if the important internal organs escape.

The *prognosis* is unfavorable. The disease is particularly dreaded in the practice of obstetricians and surgeons, and especially after parturition and surgical operations. Prognosis.

*Treatment.*—The treatment consists in general hygienic regulations and in stimulation, which should, as far as possible, be that of highly nutritious diet. To place the patient in the open air has been shown to give him the best chance of recovery. All abscesses within reach should, of course, be opened, and dead bone removed. Treatment.

### CELLULITIS VENENATA.

*Cellulitis venenata* (cell-poison) is a kind of diffuse inflammation of the (cellular) connective areolar tissue, and is due to punctures received in dissecting dead bodies. Cellulitis venenata.

Definition.

Causes.

*Symptoms.*—There is most danger from such wounds when the body is dissected soon after death. If the subject has been kept for some time, but little danger arises from cuts. The poison once absorbed into the blood brings on rapid inflammation of the neighbouring connective tissue and its absorbents. The wound or the seat of the puncture soon becomes pale, tense, shining, and boggy to the touch. Rigors, severe pain, with restlessness and great depression, soon follow, either ending in death or in suppuration, or gangrenous state of the puncture. Recovery is rare. Symptoms.

*Treatment.*—To keep the affected arm in a bath of hot water, and to open abscesses at once, are the local treatment, while carbonate of ammonia, port wine, champagne, brandy, and cinchona, are the most useful internal remedies. Treatment.

## SNAKEBITE.

Snakebite.

In India bites from venomous snakes are generally fatal. The patient immediately after being bitten becomes wholly or partially insensible. The part becomes much swollen, the temperature somewhat increased, and some pain is complained of. The swelling rapidly extends upwards. Vomiting follows. The patient becomes depressed, and his face pinched and shrunk, and there is loss of voice. The pupils are dilated, the pulse frequent, feeble, and occasionally intermitting. Diarrhœa is common, and drowsiness is a universal symptom, as is also giddiness. The breathing is hurried and often oppressed. In some cases the parts bitten become black and the body turns red. In others the whole body turns black, the eyes become yellow, and there is a froth flowing from the mouth.

Symptoms.

It is common in India. The symptoms vary with the kind of snake. The bite of the snake known as kurree-har causes blood to flow from the mouth and with the urine at once, and the pain of the part bitten is severe. The sting of the sungehoor (cobra) is also very painful, and the poison is the most virulent of all.

Treatment.

*Treatment.*—In a vast majority of cases the patient is frightened considerably, and the prostration is more rapid from fright than from the effects of the bite. Such cases rapidly improve under judicious management. In India, a tribe called Jogee generally charm the wound, and then administer purgatives, followed by opium. Where Jogees are not to be found, people generally apply to the wound the root of *Aristolochia indica* (Isurmool) or gogaree wood, ground up and mixed with water. A tight ligature close to the wound and between it and the heart is certainly beneficial. A kind of stone called zur mora is also rubbed and placed on the wound. The superstition of killing a white cock and placing the skin of the tail on the wound is still prevalent in India. The free

scarification of the wound and application of ammonia, nitric acid, or nitrate of silver, to the wound with purgatives, and also ammonia internally, often act with benefit. Some recommend amputation of the limb or finger at the next joint. In unfavorable cases deglutition and respiration become laborious, a feeling of oppression over the chest comes on, collapse sets in, and ends in death in a few hours. In such cases artificial respiration and galvanism may be of service.

### GLANDERS AND FARCY.

Glanders and farcy forms of a specific disease, due to some poison received from horses, mules, or asses. The disease when manifested in the nasal cavities is called Glanders, when in the lymphatic glands Farcy. It is a kind of malignant fever, highly contagious and also infectious.

*Symptoms.*—After an incubation period, varying from five to seven days, fever appears, the nostrils become inflamed, and the joints painful. The skin soon becomes covered with dark-coloured gangrenous patches, and the face and limbs with pustules. In a week or so pus and mucous discharge appear from the nostrils. The nostrils are swollen, ulcerated, and even gangrenous, and emit a foetid odour. The fever is generally of a low type, attended with delirium, coma, and even diarrhœa.

*Treatment.*—Carbolic acid, sulphites in various forms, may be given internally, and glycerine, with creasote or with carbolic acid, or with liquor sodæ chlorinatæ and lime-water, may be locally used as a wash.

### PURPURA.

Purpura is a peculiar unhealthy condition of tissues, blood, and capillaries; leading to disintegration of red corpuscles, with diffusion of their contents, with round red spots, which gradually assume a dark purple colour; these change, as bruise marks do, to green and yellow, till they finally dis-



appear. They occupy the whole or different parts of the body. These spots are effusions of blood into and upon the true skin from its capillaries. They last for eight or ten days and are attended with extreme prostration. Fatal hæmorrhages often take place from mucous surfaces, as the mouth, ears, stomach, bowels, vagina, &c.

**Causes.** *Causes.*—Unhealthy hygienic conditions, deficient quantity and quality of food, various depressing agents, acute fevers, as chronic affections, syphilis, Bright's disease, cirrhosis of the liver, will all produce purpura.

**Varieties.** Two forms are observed, *simple and hæmorrhagic*. *Purpura simplex* is where the hæmorrhage appears in crops, but is wholly cutaneous. The spots are well marked, roundish at first, but not raised above the skin. They gradually merge into the colour of the surrounding parts. *Purpura hæmorrhagica* is where the hæmorrhage appears from the mucous surfaces, serous cavities, or substance of organs, as well as into the skin.

**Symptoms.** *Symptoms.*—The patient complains of marked anæmia, general depression, with tendency to fainting, of pain in the limbs, chest, or abdomen. There may be slight fever, quick and compressible pulse, and even albumen in the urine, with casts of uriniferous tubes, or there may be no signs but the spots. The spleen is enlarged. The spots on the skin are variously named. Thus *petechiæ*, when the spots are scattered and few; *vibrices*, when large and formed by the fusion of several small ones; and *ecchymosis*, if larger still and like blotches.

**Prognosis.** *Prognosis.*—Repeated attacks of both kinds of purpura are common. Death from hæmorrhage is rare, but may occur if proper treatment be not applied.

**Treatment.** *Treatment.*—Turpentine administered in drachm doses at intervals of twenty minutes may safely be given, and will usually stop the hæmorrhage. Smaller doses do no good. Ergot, tannic acid, and other styptics are used. Purpura

simplex requires rest in bed, a generous diet, tonics, and especially hæmatinics, such as syrup of phosphate of iron. In purpura hæmorrhagica the bleeding threatens life, and must be stopped.

### HÆMOPHILIA.

Hæmophilia, or hæmorrhagic diathesis, resembles purpura simplex, in the presence of cutaneous hæmorrhages and of vibrices; in a tendency to violent and uncontrollable hæmorrhage on any slight solution of continuity. The existence of a preceding scratch distinguishes it from purpura hæmorrhagica. The blood is watery, with deficiency of fibrin, and the coats of vessels are extremely delicate. Hæmorrhage occurs from slightest injury to the skin, is very profuse, but never spontaneous; but though in purpura there is tendency to ecchymosis and dropsies, pains like those of rheumatism, accompanied with swelling, occur in the joints.

*Diagnosis.*—The family history of the lesion distinguishes hæmophilia from purpura. The fact that the gums are not affected will exclude scurvy.

*Prognosis.*—Death often results from the hæmorrhage.

Hæmophilia is hereditary, and though transmitted by females rarely occurs except in males.

*Treatment.*—Styptic remedies are useful, especially matico; rest, and general hygiene are the after treatment.

## DERANGEMENTS IN THE CIRCULATION OF THE BLOOD IN A PART.

### CONGESTION.

Congestion or hyperæmia signifies an excess of blood in the more or less dilated vessels of a part. It may be arterial and venous.

*Arterial or active congestion*, otherwise called determination of blood, may be merely the prelude of inflammation,

or may be followed by no further condition. The arteries of the part contain an excess of blood and the circulation is accelerated. The temperature and sensibility of the part are raised, and it is hot and throbbing. It is a physiological as well as a pathological process, as, for example, in the uterus during pregnancy, in the breast during lactation, and in gums during teething.

**Causes.**

*Causes.*—Active congestion may be due to—1. Paralysis of the walls of the vessels. In consequence of this the arteries yield to the normal pressure of blood. The paralysis or relaxation may be produced by—(a) direct irritation to the spinal cord; (b) injury to the sympathetic trunk; (c) reflex irritation through the sensory nerves; and (d) poisons, acting through the brain. 2. Sudden removal of external pressure, as in cases of cupping in a part, or ascites or hydrocele. 3. Increased pressure of blood, as due to an increased action of the heart, or to the obliteration of some blood channels, as by a ligature or by thrombosis. The blood finds its way through other channels, which thus become unduly distended.

**Mechanical  
or passive  
congestion.**

*Venous or passive congestion* may begin in the heart or special veins or a system of veins; the veins of the congested part contain an excess of blood, and the circulation is retarded or impeded.

**Causes.**

*Causes of passive congestion* are—1. Any direct obstructions, either internal or external, to the return of blood is followed by distension of the veins and by an impeded flow. The obstruction may be a ligature, a tumour, or the inflammatory exudation products. 2. The diminution of normal circulating force of the blood, as in cirrhosis of the liver, which leads to obstruction to the portal circulation and to the congestion of the other abdominal viscera. 3. Any obstruction, internal or external to the general circulation: thus mitral constriction or mitral regurgitation may lead to congestion of

the lungs; insufficiency of the tricuspid valve to congestion of the systemic veins; and pressure of the gravid uterus on the iliac veins to congestion of the lower extremities. 4. Gravitation with deficient cardiac power, as is seen by œdema of the feet and ankles. In chronic diseases, in acute fevers, in persons who are in the habit of standing long, the general nutrition also becomes impaired, the heart acts feebly, and the patient is unable to change from one position to another. The skin of the back and also the posterior portion of the lungs undergo hypostatic changes. Hæmorrhages from mucous surfaces are common in such cases. 5. Simple atony or atheroma of vessels. Simple atony occurs in old people or where the blood is poor; the heart is weak, and the vessels have lost their elasticity and contractility.

*Results of congestion generally.*—The vitality and functions of the tissues become impaired; they become atrophied, their temperature lowered, but their weight increased, owing to an increase in the amount of serum and blood in the congested vessels of the part. When congestion remains long and unabated, they give rise to—1. Hæmorrhages. 2. Effusions in surrounding tissues. 3. Fibrination or thrombosis. 4. Permanent thickening of the vessels. 5. To the hypertrophy or induration of tissues supplied by them.

Results of  
congestion.

### HÆMORRHAGE.

Hæmorrhage means either a slow exudation of blood from the vessels or its rapid escape in a gush. It occurs when arterial or venous congestion is unrelieved. Thus in cirrhosis of the liver hæmorrhage occurs from the stomach, and in mitral obstruction from the lungs.

Hæmor-  
rhage.  
Definition.

*Cause.*—Rupture of the healthy or degenerated walls of vessels or emigration of the corpuscles from the vessels into the surrounding tissue.

Cause.



Seat.

*Seat.*—Arteries, veins, or capillaries. May occur on a free cutaneous, mucous, or serous surface, upon the surface of an organ, in the interstices of tissues, or in the substance of any organ. When, owing to obstruction at a single point, it is poured out into the parenchyma of an organ, it is called an *hæmorrhagic infarction*. In this condition the blood either tears or lacerates the organ or the tissue, or coagulates and acts as a foreign body, thereby setting up inflammation and derangement of the function of the part affected. In apoplexy the blood is either extravasated into the substance or effused on the surface of the brain. The quantity of a hæmorrhage may vary from a few drams to many ounces or pounds; when it takes place in an organ it varies from several grains to several ounces.

Effects of  
Hæmor-  
rhage.Characters of  
blood.

*Character of blood.*—The blood is liquid at first, but soon coagulates and assumes various hues. In some cases the coagula after a time undergo further changes; the fibrin of the blood mixes with the broken-up tissues, and undergoes degeneration, and is absorbed; the blood-corpuscles remain unchanged, shrink, and ultimately form pigment granules. In others coagula shrink and become encapsuled, or lowly organised into fibrous tissue; or the coagula may liquefy, leaving a cystic cavity which ultimately becomes puckered up. Occasionally, however, a mere trace of blood pigment is left, and the relic of the hæmorrhage may be a deposit of minute blood crystals.

Varieties.  
Traumatic.Sympto-  
matic.

Passive.

*Varieties of Hæmorrhage.*—1. Traumatic: as by direct injury to a vessel, as by a wound, by hardened fæces, or by a calculus, or indirectly by extension of ulceration. 2. Symptomatic, as in typhoid fever, in tubercles, or in consumption; in cancer of the stomach; in piles; in Bilharzia hæmatobia. 3. Passive hæmorrhage may occur in diseased condition of vessels and in deranged and low conditions of the blood, such as anæmia, scurvy, purpura, and

typhus fever. It may also occur in passive congestions, as in diseases of the liver, spleen, and kidneys. 4. Active occurs in cases of plethora, with determination of blood to a part. 5. Vicarious is that which is supplemental to other hæmorrhages, as in females who menstruate through the breast, or through the lymphatics. 6. Spontaneous occurs in purpura hæmorrhagica. In this condition profuse bleeding almost to death occurs spontaneously from any part of the body. The violent hæmorrhage which follows a very slight scratch in hæmophilia may be considered as almost spontaneous. In the same disease the most trifling cause, as extraction of a tooth, may lead to death. 7. Local, as affecting a particular tissue or an organ, *e.g.* nose (epistaxis), lungs (hæmoptysis), &c.

Active.

Vicarious.

Spontaneous.

Local.

*Epistaxis* (bleeding from the nose) in young persons is common, and if moderate is harmless, and often relieves headache. In persons who have passed middle life it is sometimes a warning, not to be neglected, of cerebral congestion and a tendency to apoplexy. *Bleeding from the gums* occurs in scurvy, from long use of mercury, or of iodide of potassium. That from extraction of a tooth may cause bleeding lasting for a long time.

Epistaxis.

Gums.

*Hæmoptysis* (spitting of blood) is a hæmorrhage from the respiratory tract. It is due either to disease affecting the walls of vessels or to over-distension of healthy vessels, or of course, to injury. These are its pathological causes, and the diseases with which it is associated are general congestion, phthisis, pulmonary apoplexy, and the rupture of small aneurysms of branches of the pulmonary artery. Hæmoptysis may sometimes be confused with other hæmorrhages passing through the mouth, the points of its distinction will be found under the head of the several diseases.

Hæmoptysis.

*Hæmatemesis* (vomiting of blood) is common in cancer or ulcer of the stomach, cirrhosis of liver, and may less

Hæmatemesis.

often be due to aneurysm of the aorta, hysterical disorder, or vicarious menstruation.

Hæmaturia.

*Hæmaturia* (blood in the urine) may be from the kidneys or from the bladder or urethra. If from the kidneys the blood is thoroughly mixed with urine. If from the bladder the urine flows off nearly clear and then blood follows. If from the urethra it is most often due to the use of a catheter but may accompany a very acute catarrh.

Renal hæmorrhage.

*Renal hæmorrhage* may be due to congestion or inflammation of the kidneys, or cancer, calculus, or irritation of cantharides, to turpentine or to a parasite called *Bilharzia*.

Mælena.

*Intestinal hæmorrhage* occurs in typhoid fever, in cirrhosis of the liver, in internal piles, in dysentery, and in cancers.

Vicarious.

*Vicarious* occurs in connection with menstruation.

Uterine.

*Uterine*, in menorrhagia; in unavoidable hæmorrhage, as in placenta prævia; in abortion after delivery; in uterine cancer, ulceration of os uteri; and in uterine tumours.

Symptoms.

*Symptoms.*—These vary with the amount and the rapidity of the hæmorrhage and with the constitution of the patient. When it flows in large quantities and in a gush death invariably results. In strong plethoric persons it is preceded by a sense of fulness, heat, weight, and increased pulsation in the part, the circulation at the same time being languid in parts distant. There may be coldness in the hands and feet and a great feeling of chilliness. When hæmorrhage occurs the blood is of a florid-red colour poured out with a gush, stopping as suddenly as it began. The blood if collected coagulates very speedily. In weak and anæmic persons hæmorrhage occurs without any premonitory symptoms, the blood is generally of a dark colour, flows from several parts and does not readily coagulate. Hæmorrhage if not speedily checked often recurs. In all cases there is faintness and thirst. In fatal cases the pulse becomes very feeble or even fluttering, and the face pale.

There are deep sighing respiration, loss of vision, cold extremities, syncope on attempting to sit up, great restlessness and wandering delirium. When death approaches the patients feel perfect ease, contentment, and a desire to be left alone.

*Treatment.*—Try to stop the bleeding and to prevent its recurrence. The patient should have perfect rest and should lie in an horizontal position; the temperature of the room should be low, and all disturbing influences rigorously avoided. Ice applied locally to the neighbouring or to a distant part, astringent applications, pressure, and surgical remedies all may be resorted to with success. The general health should be improved by good nourishing diet, and tonics and astringents administered internally. The drugs chiefly to be relied on in these cases are gallic acid sulphuric acid, ammonio-sulphate of iron, tincture of iron and alum. Ipecacuanha in grain  $j$  doses every two hours till nausea is produced, Digitalis and Ergot, from their repute of causing contraction of the small vessels, succeed well in obstinate and recurring cases. Turpentine or Liquor Hydrargyri Bichloridi may be tried, but should never be used if the bleeding be due to pulmonary or renal diseases. In profuse bleeding and in cases of exhaustion as in hæmorrhage after delivery, Opium is highly beneficial; it acts as a stimulant to the heart and also aids in sustaining nervous powers, and causing contraction of uterine vessels. Should the bleeding be followed by loss of consciousness, and there be inability to swallow food or drink, and where other means for resuscitation have failed, transfusion may be had recourse to. For this purpose fresh blood freed from fibrin should be syringed very slowly, and from three to twelve ounces from the arm of a healthy person into the vein of the sick.

Treatment.

Digitalis and  
ergot.

Opium.

Transfusion.



## DROPSY.

Dropsy.  
Definition

Dropsy is an effect of long-continued congestion, and is a disturbance of the balance between absorption and secretion. It signifies an infiltration or accumulation of serous fluid in closed sacs or in the interstices of connective areolar tissue of a part. The fluid is an effusion through the coats of the vessels.

## Causes.

*Causes.*—All those circumstances which impede venous circulation, or alter the healthy condition of blood, or cause retention into the blood of excrementitious matters (bile or urine) from some diseases of the liver or the kidneys.

## Divisions.

*Divisions.*—1. Œdema is a localised dropsy confined to any one tissue or organ, *e.g.* eyelids, feet. 2. Anasarca affects the general cellular tissue of the whole body. 3. Hydrothorax when confined to the pleuræ. 4. Ascites to the peritoneum. 5. Hydrocephalus to the ventricles of the brain. 6. Hydrocele to the tunica vaginalis. 7. Myxœdema.—The term myxœdema has been applied to a peculiar condition of the skin found in cretinoid women. It is distinguished from œdema of Bright's disease by the absence of albumen in the urine, and from scleroderma by the softness of the skin.

Characters  
of dropsical  
fluid.

*Characters of the fluid.*—It is thin and watery, of a very faint yellow colour, clear and transparent; specific gravity 1008 to 1012. It is generally alkaline. Chemically, it consists of water holding in solution large quantities of albumen, some chlorides, extractive matters, and sometimes crystals of cholesterine. It is allied to the serum of blood, but differs from it in being of a lower specific gravity, in containing more water and less of solid constituents.

## Tests.

## Varieties.

*Varieties.*—Dropsy may be acute or active, and chronic or passive. The acute may be due to the sudden action of cold and wet upon the skin, which by checking its excretion (perspiration) produces disease of the kidney and subsequently dropsy. Local irritation may cause an

appearance due to effusion of serum into the subcutaneous tissue, easily confused with acute dropsy when occurring in the face, as is sometimes the case in children with boils on the head. The passive may be due to Passive. 1, obstructed circulation; 2, defective absorption, as in disease of the heart and of the liver; 3, watery state of the blood, as in wasting diseases and in diseases of the lungs; 4, any local pressure on a special vein, as in pregnancy; or 5, anything that impoverishes the blood, as improper hygienic conditions, excessive discharges, and 6, various chronic diseases, as phthisis, cancer, and scurvy.

*Symptoms.*—*Objective.*—The swelling appears slowly at first in the most dependent parts, in those which are most exposed, or in places of loose areolar tissue. It pits on pressure and the skin over it is tense, shining, and congested. Symptoms.  
Objective  
*Subjective.*—Discomfort and uneasiness, and Subjective. a feeling of tightness over the affected part, but no actual pain or tenderness.

*Treatment.*—Remove the cause, mechanical or other- Treatment. wise. If due to impoverished blood improve the general health; if due to the skin, intestines, or the kidneys being at fault, promote their secretions by watery purgatives, diaphoretics and diuretics, of which one of the most effectual is the vapour bath. Rest, gentle pressure over the affected part, and elevated position, are of the first importance. If the quantity of the fluid be great it may be removed by paracentesis in the case of thorax or the abdomen, or by acupuncture or scarification in anasarca. Great caution should be observed where puncture is necessary in the last case, as sloughing is apt to ensue.

## INFLAMMATION.

Inflammation is an exaggeration and perversion of the reaction between the blood and tissues, and is a local lesion Inflamma-  
tion.  
Definition.

of nutrition with concentric vascular excitement, resulting in excessive exudation of liquor sanguinis (more or less altered in quality), in cell proliferation, with the escape of white corpuscles, or in the overactive proliferation of tissue elements; its nature being destructive at the centre of the inflamed part, often formative around and even at some distance from it. Inflammation is not always hurtful in its action. Thus, in local injuries it forms bonds of adhesion between two surfaces; it also prevents the contents of hollow viscera from escaping into the neighbouring serous cavities by setting up of fresh inflammation leading to adhesion.

The state of  
blood and  
vessels.

Causes of  
stagnation.

*The state of blood and vessels in an inflamed part.*—At first the arteries are enlarged and contain large quantities of blood; the flow is rapid, subsiding gradually to the normal rate, and finally becomes so slow that stagnation occurs. This may be due to the adhesiveness of blood-corpuscles to one another and to the walls of the vessels which are plastic and less fixed. Under the microscope the *capillaries* seem at first contracted and then dilated; the blood current more rapid at first, then becomes slow and fluctuating, and eventually arrested. *White corpuscles* which move more slowly than the red corpuscles, and always along the edge of the stream, now cling to the walls of the capillaries. *Red corpuscles*, which lie in the centre, collect in masses, thus the blood-vessels become blocked up and stagnation results. As the case advances exudation of liquor sanguinis or of lymph takes place and the white corpuscles now migrate with it. This increased supply of exudation lymph or liquor sanguinis and the migrated white corpuscles to the tissue, and the increased heat produced on account of accelerated oxidation, gives to tissues and their blood-vessels increased nourishment and also leads to the proliferation of cells. All these changes take place in the focus of inflammation, but along and

around it we always find a zone of congestion, and another beyond this, that of determination.

If the blood from an inflamed part be drawn off and allowed to coagulate in a vessel it exhibits a buffy or *yellow coat*; its upper surface is concave or cupped. The buff may be due to a slow coagulation of fibrin, to the red corpuscles in the centre running together rapidly, and therefore sinking to the bottom; the liquor sanguinis and white corpuscles and fibrin entangled in its meshes form the upper layer; the white corpuscles contracting still more give to the upper layer a concave or cupped appearance. In inflammation, small arteries, capillaries, and veins, become enlarged, elongated, tortuous, and varicose.

State of  
blood.

*State of the tissues.*—Nutrition becomes deranged, and probably increased, and there is a tendency to cell proliferation or cell growth. This may result from an increase in size of already existing cells and their nuclei, or from the division and subdivision of these nuclei and their cell contents, or from the new cells being formed by an endogenous process. The nutrition may become impaired when the cells decay and degenerate, or develop into a lowly organised tissue.

State of the  
tissues.

*Pathology.*—The mutual vital relations between blood, blood-vessels, and tissues, is much disturbed in inflammation. When a tissue is at first irritated, either directly or indirectly, an impression is produced on the centripetal nerves, and from thence communicated to the vaso-motor centre, from this centre it is then reflected to the centrifugal nerves, and through them to the vessels of the irritated part. The vessels now dilate and their walls relax, blood flows in them with increased rapidity and in increased quantity until stagnation occurs. The red corpuscles also readily adhere to their walls and allow free passage to the liquor sanguinis and white corpuscles. Thus we have a central stasis (at the focus of inflammation) and an increased quantity of

Pathology.



blood (congestion), with increased circulation (determination), beyond it.

**Causes.**—*Causes.*—Blood when poor, as in anæmia, or scrofula; after previous attacks of inflammation, local congestions; and blood when rich, as in plethora, are predisposing causes of inflammation. The poisons of rheumatism, syphilis, eruptive fevers; extreme heat and cold; and any direct local irritation, as wound, calculi, worms, or chemical irritants, are the exciting causes of inflammation.

**Symptoms.**—*Symptoms.*—There are local and constitutional symptoms.

**Local.**—*Local.*—These are heat, redness, swelling, and pain. *Heat* is evident to the touch and known by surface thermometer. *Redness* is most marked in the centre of inflammation and fading at the circumference, disappearing for a time on pressure; it may vary from a bright crimson to a dull purple. In plethora, where determination preponderates over inflammation, the redness is bright crimson; in anæmia, where congestion predominates, it is of a dull purple colour or dark, and the congested part is hard to the touch. *Swelling* varies with the degree and the seat of inflammation and the rigidity of the part inflamed. *Pain* varies with the nature and the kind of tissues affected. In the unyielding tissues, as the fibrous or bony tissue, it is agonizing and severe. In the loose mucous membranes it is very slight. In the skin and in mucous membrane, when it is present, it is itching, tingling, or burning. In serous membranes, stabbing or lancinating. In bones, aching. The pain may be *sympathetic*, as noticed in parts distant from the seat of inflammation, as in the knee in hip-joint disease. In a case of inflammation, one or other of these symptoms may be absent. In inflammation of the internal organs, as the head, the only observable symptom present is pain. In such cases the derangement of their functions therefore constitutes one important means of discovering the presence of inflammation. *General*

or *constitutional* symptoms: soon after the inflammation is set up in a part it affects the nervous and the circulatory systems, the temperature of the body is therefore raised; this condition is known as *Inflammatory fever*, secondary or symptomatic fever, or the pyrexial state.

The febrile symptoms vary as the subject is sthenic or asthenic, and also vary in intensity according to the tissue affected. In strong robust individuals it sets in with chills or rigors, followed by the heat and dryness of the skin. The fever comes on in paroxysms, at irregular intervals, alternating with flushings and sweats. Chills come about the middle of the day, and towards evening the palms of the hands and the soles of the feet become hot and dry. The pulse is 120 in a minute, soft, jerking, and compressible. The respirations are hurried, the secretions scanty, the mouth parched, the bowels constipated. There is usually great thirst. The patient has disturbed sleep, and feels languid and weak on rising in the morning. The urine is scanty, high coloured, of high specific gravity, and also turbid, from its containing more lithates and less chlorides. During the fever the chlorides are diminished. The fever is somewhat different in tropical countries: in them the skin is hot but not pungent; the temperature of the trunk is higher than that of the extremities; the pulse is soft and small; the tongue furred in the middle and florid at the tip and edges, and the bowels have a tendency to become loose. In *anæmia* the fever assumes a low typhoid character; the pulse becomes more feeble and frequent, and sometimes barely perceptible; the tongue more dry; there are sordes along the lips and gums. Hiccup, hurried breathing, and coma supervene. If such cases terminate favorably there is a period of crisis, followed by slow convalescence.

Febrile  
symptoms.

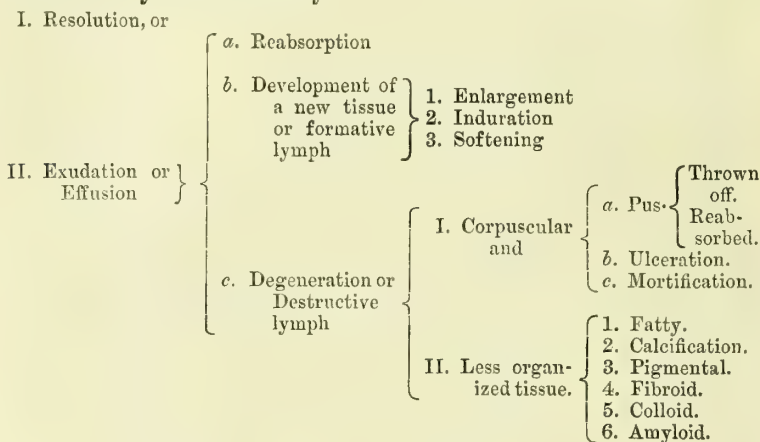
If inflammation remains unrelieved for some time, the patient rapidly loses flesh and strength, and typhoid symptoms set in; or the inflammation runs on to sup-

Termination.

puration and the fever assumes a hectic character, and is attended with profuse sweating.

Results.  
of inflamma-  
tion.

*Results or the terminations of inflammation.* — Inflammation may terminate by—



Resolution.

I. *Resolution* is a complete restoration of the inflamed part to its normal state, the local symptoms subside, the blood, blood-vessels, and tissues are restored to their normal condition, the fever disappears, the pulse becomes soft and less frequent, the skin cool and perspiring, and the urine abundant, throwing down copious deposit of lithates and a large proportion of urea. Where resolution takes place very quickly, the inflammation may change its seat and attack some other part. This is termed metastasis.

Effusion or exudation.

II. *Effusion* or exudation is an escape of fluid from the vessels. It may be—1, of serum; 2, of liquor sanguinis; 3, of fibrin (coagulable lymph); 4, of blood, as in dysentery; and, 5, of mucus discharged from the surface of the mucous membranes. Effusions undergo—(a) reabsorption, the inflamed part is restored to its normal state. (b), formative development of a new tissue, which may be with *enlargement, induration, and softening*. In this there is effusion of coagulable lymph (fibrinous or plastic lymph) in the inflamed tissue or part. The kind of tissue so

Termination

Formative effusion.

developed is the fibrous, fibro-cellular, or, in some cases, a tissue nearly allied to that which may be diseased. It is rarely converted into muscular or nervous tissue.

*Theory of formative development.*—Some believe that the leucocytes or the cells produced by proliferation become developed, and that the liquid portion of blood merely nourishes them. Others maintain that the fibrin coagulates, fibrillates, and itself forms tissues. It is thus that wounds cicatrize by formation of granulation tissue and become thick and contracted, and that, in cases of serous inflammations, adhesions and thickenings take place between the layers of the membranes.

Theory of  
development

(c). Destructive development or effusion. In this process the effused lymph undergoes a process of corpuscular degeneration (softening or liquefaction). The new cell proliferation takes the form of pus cells, which are either thrown off as pus or may be reabsorbed as exudation granules, or of ulceration, with softening and disintegration of layers of tissues, or of sloughing, gangrene, and sphacelus. When pus is reabsorbed it undergoes a kind of less organized degeneration, known as fatty degeneration, calcification, pigmental, fibroid, celloid, and amyloid degenerations. The exudation corpuscles now become charged with oil globules and are converted into granulation cells, pus cells, or exudation granules, and the tissue becomes dry, wasted, horny, and stiff.

Destructive  
effusion.

*Suppuration.*—Pus is a thin, yellowish-white, creamy fluid, unctuous to the touch, slightly sweetish in taste, and without any smell. Reaction alkaline; specific gravity 1030; consists of liquor puris, pus-corpuscles, granules, and nuclei. The pus-cells are spherical in shape,  $\frac{1}{2500}$  inch in diameter, distinctly cellular, containing granular substance, and a compound or simple nucleus, which becomes clear on the addition of acetic acid. The liquor puris contains albumen, inorganic substances, and fatty

Suppuration.



Pathology of  
suppuration.

matter, and resembles liquor sanguinis; the pus-corpuscles corresponding to the blood-corpuscles which have escaped from their vessels and mixed with disintegrated cell elements of the tissue. During inflammation the cell elements undergo active changes and form new cells, and when the inflammation is very intense, they are either slowly organized or converted into pus-cells. These pus-cells have the power of spontaneous migration or movement. In the early stage of severe inflammation we find migrated leucocytes in the tissues, but as inflammation advances an increase by cell proliferation and endogenous formation takes place, and the leucocytes are then converted into pus-cells.

Varieties of  
pus.

*Varieties of pus.*—*Sanious*, when mixed with blood. Thin and acrid or *ichorous*, when it contains flakes of lymph. *Cheesy* or *curdy*, when the fluid part is absorbed and a pultaceous mass remains. *Lardaceous*, when it is mixed with blood clots. *Grumous*, when mixed with degenerated tissues.

Phenomena  
attending  
suppuration.

*The phenomena attending suppuration.*—The part is inflamed at first, swollen, tense and throbbing; its central portion next becomes soft and fluctuating, and the skin over it red and shining. The patient also suffers from rigor and hectic fever as the case advances. The pus is either removed by absorption or the abscess increases in size till its contents reach the surface and burst. It is believed that the pus-corpuscles have the power of softening down the tissue with which they come in contact, and thus cause its liquefaction. The liquefied tissue may either be reabsorbed or undergo fatty degeneration, and thus the tissue may become atrophied.

Termina-  
tions.

Causes of  
suppuration.

*Causes.*—1. Intensity of inflammation. 2. Persistent inflammation. 3. Weak or poor state of the constitution or of the blood. 4. Long exposure of effused lymph to the contact of air. 5. Nature of the tissue. When an

abscess has burst, it leaves a chasm or an ulcer. But ulceration may occur without an abscess. Thus when intense or severe inflammation affects the skin or the mucous membranes it at once leads to the destruction of a portion of the tissue, leaving a chasm or an ulcer. When the destruction is superficial and only the epithelium is removed it is called excoriation or *abrasion*, but when it takes place in a mass, owing to the intensity of inflammation or to the extreme low vitality of the system, it is called a *slough*.

*Ulceration* often begins as a bleb or a vesicle, the nutrition of the part is cut off, and an ulcer results. When healthy it undergoes a process of repair by granulation and cicatrization, but when unhealthy it rapidly extends and leads to the destruction of the tissue in a mass, producing *gangrene* or sphacelus. During repair, effusion of plastic lymph takes place over the ulcerated surface, which abounds in exudation corpuscles or granulation cells. The cells nearest the surface are converted into pus-cells, those deep seated into fibro-cellular tissue, and those near the edges into the epithelial cells. The cicatrization next follows and the ulcer begins to contract, and a thin blueish vestige is left over the surface of the sore. Ulceration.

*Sloughing*.—Where the inflammation is intense, and the tissues destroyed in a mass, sloughing is said to result. If in the soft part it is called a slough, if in bones the sequestrum. Sloughing

*Gangrene*.—When inflammation is intense, persistent, and occurs in a low state of the blood the nutrition and circulation of the inflamed part is cut off and gangrene is said to result. Thus gangrene of an internal organ is characterised by an intensely foetid discharge, which may contain fragments of destroyed tissue. It is always associated with great depression of vital powers. Gangrene.

*Special peculiarity of each tissue in inflammation*.—In areolar tissue the inflammation is not attended with much Special peculiarities of each tissue.

pain and suppuration is common. In *serous* membranes there is marked redness, loss of polish; the tissue is opaque, highly vascular, and thickened; there is tendency to the effusion of serum (organizable) and plastic lymph between its two surfaces, by which they become adherent. In many cases the effused lymph undergoes a fatty degeneration or liquefaction, and may be either absorbed or converted into pus. In *mucous membrane* the inflammation pours out an exudation on its surface, which may be a mere increase of its normal secretion, may contain large quantities of fibrin, may be purulent or bloody, and lastly, may be associated with destruction of the submucous tissue. The terms *catarrhal*, *croupous*, and *diphtheritic* are applied to three well-marked varieties of inflammation in a mucous membrane.

Morbid  
appearances  
in inflammation.  
Mucous  
membrane.  
Catarrhal.

*Morbid appearances in inflammation of mucous membrane.*

1. *Catarrhal*.—The mucous membrane is dry at first, hyperæmic, and swollen. Subsequently an increase takes place in the quantity of the epithelial and mucous elements, and in the secretion of the mucous glands. In severe cases vascularity is more marked, the cells more rapidly formed, swollen but less developed, the epithelium loose and falls off more readily; and secretions, owing to their containing a larger number of cells, generally become purulent. If inflammation continues for a long time the subepithelial tissue becomes infiltrated with young cells, and the surface presents numerous abrasions or ulcers. Besides the mucous membrane, the *mucous follicles* which it contains also become enlarged from the multiplication of their gland elements; their contents soften down and form small follicular ulcers. These ulcers are best seen in inflammation of the intestines and of the pharynx. In some cases they extend even to the gland structures, as in gastric catarrh.

Croupous.

2. *Croupous*.—At first it is only an intensified form of

catarrhal inflammation. This is soon followed by an exudation containing a large quantity of fibrin upon the surface of the tissue. The fibrin rapidly coagulates and fibrillates, and is known as the false membrane. This membrane may be firm and tough, or soft, and can be readily removed, leaving the normal mucous membrane beneath only deprived of its epithelium. In this variety of inflammation, after the separation of the false membrane no scar is left, and when inflammation subsides the mucous membrane returns to its normal condition.

3. *Diphtheritic*.—In this variety there is an exudation of fibrin upon, beneath, and within the mucous membrane. Exudation appears as a whitish discoloration, and is also known as false membrane. It is often less readily removed than in the croupous variety. In this variety the circulation is interfered with, and the tissues lose their vitality, and form ash-coloured sloughs; after a few days these sloughs fall off, leaving an unhealthy ulcer and afterwards a scar.

Diphtheritic  
inflammation.

Inflammation, whatever its kind, may be acute or chronic. The chronic generally leads to great thickening of the parts affected. *Interstitial inflammation* is a form in which there is an increase of cells in the substance of the part without any exudation on the free surface. It may lead to the gradual destruction of the cellular elements of the organ. It is thus characterised by a primary enlargement, followed by atrophy. This inflammation occurs in the liver or the kidneys where it is known as cirrhosis, when in the brain or cord, it is called sclerosis.

Interstitial  
inflammation.

*Treatment*.—Local and general. Remove the cause. Keep the part inflamed at perfect rest and in position. Obtain, if possible, resolution, failing this, either terminations, adhesions, or suppuration. Attend to the urgent constitutional symptoms, diminish the fever, procure rest, and free the secretions. For the increased vascularity in

Treatment—  
Local and  
general.



Treatment of  
exudations.

Mercury.

the inflamed part use vascular depressants. If the part feels œdematous and congested, leeches, cupping, scarification, punctures, or incisions, may be required. Medicines which have a powerful influence over the heart, and act in diminishing the force of the blood, as aconite, veratrum viride, digitalis, tartar emetic, may be given to promote secretions, but purgatives, diaphoretics, and diuretics, should be used with caution, as they do harm when given in inflammations of the bowels. Very often in inflammations affecting only the superficial parts or in their early stage, the application of cold or heat and moisture or medicated fomentations are of service; even the application of iodine paint to the surface has been tried with success. Exudations should be removed if possible, or the absorption promoted. Mercury, iodide of potassium, and alkaline carbonates internally, and blisters, iodine paint, irritants, stimulants, issue, setons, plasters, or even actual cautery externally are the chief means by which these objects are effected. The constitution requires treatment on general principles of hygiene. Fever or any urgent symptoms, as pain, &c., need special attention. Every precaution must in the first instance be taken to prevent suppuration, but if suppuration be inevitable promote it by poultices, supporting at the same time the strength by generous diet and with ammonia and bark. In some inflammations mercury acts as a charm. In inflammation of the mucous membrane or of the connective areolar tissue, or where suppuration is threatening, it should be used with very great caution; it is absolutely injurious if given in cachexia, scrofula, and in diseases of the skin and kidneys. It is highly useful in inflammations of the serous membranes, and in those of the brain and spinal cord where the exudation product has no outlet to discharge, and is attended with impairment of functions.

## DERANGEMENT OF NUTRITION.

*Hypertrophy* is an abnormal increase of tissue growth over waste. The hypertrophied part is increased in size, weight, and in number of its tissue elements. The increase of tissue elements may be from the enlargement of the previously existing elements, or from the deposit of new ones. Thus, hypertrophy of unstriped muscular fibres of the womb during pregnancy is an example of enlargement of previously existing elements, and hypertrophy of the liver, the testicle, or the lymphatic glands, is due to a deposit of extraneous matter, or to development of inflammatory or other growths. In the case of hollow viscera their walls become thickened. Hypertrophy.

*Causes.*—1. The deposit of some extraneous matter or morbid growth, as in the liver. In this condition the liver is hypertrophied although the normal structure of the organ may undergo atrophy or degeneration. 2. Increase in blood of those materials which are necessary for nutrition and secretion of a tissue or an organ. 3. increased quality of healthy blood in a part. 4. Increased healthy functional activity of a tissue or an organ, owing to its being called upon to do extra work, all produce hypertrophy. Thus, in stricture of the pylorus or of the urethra, the stomach or the bladder becomes hypertrophied. In cases of congestion obstructing the flow of blood through the heart hypertrophy of the heart results. Causes.

As a result of exercise hypertrophy may be perfectly healthy, as in the cuticle of a labourer's hand, in the calves of ballet girls, in the blacksmith's arm. In cases of disease of one kidney or of one lung the other healthy kidney or the lung becomes hypertrophied, in order to remove from the blood the urea or carbonic acid which is not removed by the diseased kidney or the lung. Local pressure applied and removed gives rise to intermittent hypertrophy, *e.g.* corns.

*Atrophy* is an excess of waste over tissue growth, without change of structure. It is an arrest of nutrition, followed by diminution of functional activity of a tissue or organ. There is diminution in size and weight and in number of tissue elements. Atrophy may affect all the tissues of the body, or may be confined to some particular part. Thus the feet of Chinese ladies are in a condition of artificial atrophy, due to the constant pressure of bandages. In India the Joghees practise as an extreme mortification of the flesh, a habit of tightening their right arm round their head with a rope and keeping it so elevated throughout life. Thus all nutrition and circulation is cut off from it, and the arm becomes completely shrivelled up.

Causes.

Varieties.  
Simple  
atrophy.

*Varieties.*—It may be *simple* or general, and *numerical* or partial. In *simple* atrophy, as in ordinary emaciation, the fat gradually disappears from the subcutaneous adipose tissue; the fat cells are only diminished in size, their contents removed and replaced by serous fluid; there is no destruction or diminution of their number, their cell walls and nuclei become more distinct. All glandular organs, as liver, spleen, kidneys, mammæ, are subject to this kind of simple atrophy.

Numerical  
atrophy.

*Numerical* atrophy is a degeneration, and is a quantitative rather than a qualitative change. It is that which results from cirrhosis of the liver and similar processes. In this variety some of the elements of the tissue are actually destroyed, their vital power is gradually exhausted, there is a molecular death terminating in a granular *débris*. There is appearance in them of fat or pigment, or other abnormal matters, which had no visible existence before.

Nervous  
atrophy.

Nervous atrophy, a term first used by Morton, is applied to a general wasting, in which there is no fever, no cough, no dyspnoea, no disturbance of digestion. Is supposed to be due to an affection of the nervous system. This form of atrophy is often a termination of life in the epileptic.

Cause.

It is a condition observed very often in persons who have resided in a warm climate and afterwards returned to a temperate one. *Symptoms.* The face is pale, there is a sensation of general languor and indisposition to take exercise, but it is characteristic of the disease that its prominent and only important symptom is the continued wasting. The disease is also seen in elderly men, in whom it lasts a very long time, and is associated with extreme restlessness and hypochondriasis. It is also met with in young women who have been disappointed in their objects in life. The prognosis is always grave, but change of air and of scene, with alteratives, have sometimes arrested its progress in the young, and more rarely in persons advanced in life. Symptoms.

*Causes of general atrophy.*—*Deficient nutrient supply*, as deficient food; the stricture of œsophagus or pylorus, preventing the passage of food; dyspepsia, preventing assimilation and causing non-absorption of chyle; obstruction to the thoracic duct; or diseases of the mesenteric glands. *Excessive waste*, as in hæmorrhages, profuse suppurations; exhausting diseases or discharges; excretion of albumen or sugar; *tissue change*, as in fevers; *impaired nutritive activity*, as in old age. Atrophy is rarely a simple process, and depends upon the combination of two or more conditions. Thus emaciation or atrophy in phthisis is due to *excessive drain* from (a) loss of nutrition, (b) profuse expectoration, (c) profuse sweats, and (d) diarrhœa; *deficient supply* and *imperfect oxydation* of the blood; *interference with assimilation* from changes in the structure of the stomach or intestines; and *increased tissue change* as due to fever and other depressing causes. Causes of general atrophy.

Partial atrophy may be due to *diminished or imperfect supply of blood* to a part. The nutrient vessels of the part are obstructed by pressure upon them from within as well as from without. Thus, in cirrhosis of the liver the interlobular Partial atrophy.



tissues press upon the vessels, the blood supply becomes diminished, and as a result the secreting structures atrophy. In thoracic aneurysm, the direct pressure on the sternum or vertebræ diminishes their nutrition and causes atrophy of the bony tissue. *Diminished functional activity or deficient exercise* gives rise to atrophy. Those parts which are no longer required to serve any purpose in the economy gradually atrophy and waste—the ductus arteriosus, umbilical arteries and veins, Woolffian bodies; the involution of the uterus after delivery; muscles in infantile spinal paralysis; limbs in ankylosis; the lower part of the bowels in cases of stricture; the mammæ in old women; all are subject to partial atrophy. The *action of special substances*, as mercury, iodine, bromine, lead, and alkalis, tend to produce atrophy, *e.g.* breasts and testicles from bromide of potassium. *Chronic inflammations*. In this condition a new growth of fibroid tissue (degenerations) press upon the minute structures of the organ, and cause impairment of their nutrition and vitality, and thus lead to atrophy—*e.g.*, cirrhosis of the liver. *Defective nerve supply*, as best seen in paralysed limb.

Physical  
characters of  
atrophied  
part.

*Physical characters.*—The atrophied part loses in weight and size. It contains less blood, is drier, more firm and fibrous in texture, and its functions are reduced; in case of bones, only the weight is diminished but not the size. In them there are two varieties of atrophy, known as *concentric* and *eccentric*. In the *concentric* variety the compact and cancellous tissue of bone becomes absorbed, the medullary canal diminishes in size, and the whole bone becomes smaller; in the *eccentric* atrophy, no diminution in size of the bone takes place, there is merely conversion of compact into cancellous tissue, the whole bone becomes merely rarified, light, and brittle. This occurs in old age without disease.

## DEGENERATION.

*Degeneration* means degradation of tissue, and is a substitution in the body of a lower for higher form of tissues. It is characterised by alteration in the quality of the tissues, attended by diminution in the nutrition, by the impairment of function, and by the complete destruction of their original elements. In this process the elementary constituents of the tissues of the affected part become gradually destroyed, their place being taken by granular matter, fat, or pigment. These abnormal matters are said to be due to decomposition of the normal tissues and to the deposit of their insoluble constituents, or to the deposit from the blood. It has two forms, metamorphosis and infiltration.

Degenerations.  
Definition.

*Metamorphosis*.—In this condition the albuminoid constituents of the tissue are converted into a new material, the original tissue elements are destroyed, the intercellular substance softened down, all trace of the structure lost, and its function completely arrested, hence we have *fatty*, *colloid*, and *mucoïd* degenerations, or metamorphosis.

Divisions.  
Metamorphosis.

*The fatty metamorphosis*.—In this degeneration the normal tissue elements are replaced by fat cells, as seen in voluntary muscles; in muscular fibres of the heart and of the blood-vessels; in nerve tissues; in softening of the brain and spinal cord; and in bones, liver, kidneys, &c.

Fatty metamorphosis.

Where the metamorphosis is not complete the affected part becomes dry by the fat becoming absorbed, or it is converted into a cheesy mass: thus the degenerated tissues, instead of consisting of fat cells, now contain withered cells, fat granules, and crystals of cholesterine. This change is known as *caseation*, or caseous, or cheesy metamorphosis, and is best seen in scrofulous and lymphatic glands and in the lungs. In *cheesy* metamorphosis, the part is dried up, its cells pressed together, and the blood-vessels are also few. The cells are often atrophied, and the fat has under-

Cheesy metamorphosis.

gone saponification, and cholesterine been formed. Very often the tissues form an encapsuled fibrous mass, or become calcified or become infiltrated with calcareous matter. In some cases they undergo further softening or liquefaction.

**Calcification.** *Calcification.*—Caseous masses of long standing usually become calcified, and are seen in intestines and lungs in this state.

**Characters.** *Characters of fatty metamorphosis.*—The affected part is pale, yellowish in colour, and opaque; its elasticity and power of resistance are impaired or lost; and its functions are impaired.

**Sources of fat.** *Sources of fat in the body.*—The oleaginous, saccharine, and albuminous constituents of food, when taken into the stomach, undergo decomposition and become converted into fat. This fat is generally useful as hydro-carbon, and is removed by a process of oxydation. Where the oxydation is incomplete the fat is not removed, but accumulates in cells of adipose tissues and in those of the liver, and thus causes obesity. The incomplete oxydation may be due to disproportion in the blood between oxygen and oxydisable materials. It is generally believed that red corpuscles are the carriers of oxygen, and if the supply of blood be diminished or interfered with, the red corpuscles become fewer, and consequently incomplete oxydation occurs, and fatty degeneration is the result. Thus emboli, by diminishing the supply of blood to a part, diminish the oxydation, and lead to softening or fatty degeneration. In poisoning by phosphorus, lead (wrist-drop), and other substances; in general anæmia; in chronic and other acute diseases (lungs and heart); and in old age; in anchylosis of the joints; and in paralysis from lesions of the brain (the circulation becoming diminished) and cord; fatty degeneration is the most common result.

**Mucoid degeneration.**

*Mucoid and colloid degeneration or metamorphosis* is a peculiar degeneration (softening) of the tissues. It is

called colloid when the cells and mucoid when the inter-cellular substance are the seat of degeneration. *Colloid*.—The albuminous constituents of tissue cells are converted into a glue-like substance, the original substance being destroyed; it contains sulphur and is not precipitated on the addition of acetic acid. It is best seen in enlargement of the thyroid gland, and of the lymphatic glands. *Mucoid*.—The albuminous constituents of the intercellular substance are converted into a soft, jelly-like mucus; as seen in the costal cartilages, and intervertebral substance of old people, and the serous membranes.

*Amyloid, lardaceous, or waxy degeneration or infiltration* is also known as bacony albuminoid or scrofulous degeneration. It consists in the deposit of a new material (albumen) from the blood and thus infiltrating the tissues or organs. Some believe this degeneration to be a chemical change in the blood owing to its loss of alkalies. It is rarely a primary affection, and occurs as a sequel of cachexia, of many exhausting diseases, of long-continued suppuration, as in chronic diseases of the bones. It also occurs in empyema and chronic lung diseases; in chronic kidney diseases; in chronic intestinal ulcerations; and in chronic syphilitic bone diseases. *Chemical test*.—It gives a peculiar reaction with iodine, and with iodine and sulphuric acid. Iodine changes it to a deep brown-reddish colour, which soon fades away. Iodine and sulphuric acid give a blackish, blue, or violet tint.

Amyloid,  
lardaceous,  
or waxy.

Tests.

*Lardaceous degeneration* is a modification of albumenoid degeneration. In the former there is a deficiency of potash and of phosphoric acid, an excess of soda, hydrochloric acid and of cholesterine.

Lardaceous  
degeneration.

This degeneration commences first in the muscular coats of small arteries and their capillaries, it then attacks tissue cells, subsequently voluntary muscular fibres, and, lastly, extends to the surrounding tissues or to the whole



organ. The circulation in the organ becomes impeded, the arteries diminish in calibre and their cells increase in size, their nuclei disappear, and they become coalesced and form a homogeneous mass. The pressure exercised by the infiltrated substance upon the organ leads to further impairment of its nutrition and its function.

Condition of  
organs.

*Condition of the organ.*—The organ is increased in size, weight, and specific gravity; its surface is smooth, its capsule tense and stretched. In consistence it is very firm, and it is pale in colour and translucent. On section it has a homogeneous waxy appearance. Examples: liver, spleen, kidney, lymphatic glands. The degeneration is common in the villi of the intestines and in the mesenteric glands, and the so-called corpora amylacea in the olfactory nerves.

Infiltration.  
History.

*Infiltration.*—Is a form of degeneration in which a new material is deposited from the blood in the meshes of the original tissue elements, which remain unchanged for a time but are ultimately destroyed. There is no softening of the intercellular substance, no loss of structure, no interference with function for a considerable time. Thus we have—*Amyloid, Fatty, Calcerous, and Pigmentary* degenerations or infiltrations.

Fatty  
infiltration.

*Fatty infiltration.*—It was at one time supposed that in this degeneration there is actual decay of tissue, attended with the presence of oil-globules in its substance. At first the fat deposits between the fasciculi of muscles, and the muscular elements remain unaffected. In obesity and in animals which have been fattened, the fat first accumulates in the blood and is then deposited in the liver. Thus, the increased formation of fat in the liver as in phthisis and in constitutional disorders, where the liver is increased in size and greasy, and its cells distended with oil-globules, is not, as has been supposed, a case of degeneration. In true degeneration, the cells are

destroyed, and studded with oil or minute granules. These granules are the products of decomposition of protoplasm, and they collect immediately around the nucleus. As these molecules increase in number and size the nuclei become obliterated and the cell walls distended and thin, so that they even burst and set free the granular matter. The oily matter becomes diffused through the tissues, and a pulaceous *débris* known as detritus is formed, which consists of cholesterine, broken up tissue, and oil.

Thus, in inflammatory processes, epithelial cells, connective-tissue cells, and even pus-cells, undergo this degeneration and become granule cells. This degeneration occurs as a normal process in involution of the uterus after parturition.

*Calcification or petrifactive degeneration or caseation* is a fatty infiltration. It occurs in tissues which have lost their vitality and have previously undergone fatty infiltration, as *e.g.* in arteries, and in cardiac valves. On section the calcified mass is hard, brittle, and rigid, and gritty to the touch. Tubercles, syphilitic growths, carcinoma, or abscesses, at one time or another undergo this degeneration. Petrification.

*Pigmentary degeneration or infiltration* is not always an abnormal formation of pigment matter in the tissues. Changes occur which lead to the deposition of the colouring matter from the blood or bile, and infiltration into the surrounding tissue, either in the form of liquid or granules. It may present various hues, as red, yellow, or brown and black. In bruises pigmentation occurs, the blood corpuscles lose their hæmatin, which diffuses into the surrounding tissues and stains them, the granular pigment being precipitated among the tissues, and forming small nodules. Another example may be quoted. When bile is prevented from being excreted, it at first stains the tissues, and then granular pigment deposit takes place. In Addison's disease the cells of the rete mucosum are filled Pigmentary degeneration.

with granular brown or black pigment. In various skin diseases and cutaneous inflammations by acids or irritants, the development of pigment is a common result of extravasation of blood. During congestion this escape of pigment takes place either by the rupture of capillaries or by emigration through their walls, with blood-corpuscles and liquor sanguinis. Thus the tissues, the cells, and even the intercellular substance, all become infiltrated with pigment.

Calcareous  
degeneration.

*Calcareous degeneration* is a deposit which consists of carbonate and phosphate of lime, and occurs at an advanced stage of albuminoid degeneration. The deposit takes place chiefly into the intercellular substance. It generally deposits from the blood, in which its constituents were retained in solution by carbonic acid. The disease chiefly occurs in the inner coats of arteries and in capillaries, in the tendons, cartilages, and in the skin. It is a constant deposit in old morbid inflammatory products, as false membranes, which occupy the pleuræ or the pericardium; tubercles, or pus, or clots, are also subject to these deposits.

### MORBID GROWTHS.

Morbid  
growths

Though belonging to the department of surgery, are often seen by the physician, and therefore require a passing notice. They are forms of structural degenerations or vitiated nutrition, may be inflammatory or non-inflammatory. The non-inflammatory include tumours, the inflammatory the tubercles.

### TUMOURS

Tumours.

Malignant.

Tumours are any non-inflammatory growths, and may be malignant or non-malignant. The malignant are prone to unlimited increase, recur after removal, are capable of multiplicity, and difficult of spontaneous arrest or cure;

they always infiltrate tissues, and are associated with a vitiated condition of the blood or dyscrasia. Their development is preceded and accompanied by a cachectic state.

*Composition.*—Abnormal fibrous tissues, fluid contents and cells of various sizes, often large, distorted, and crowded together. Composition.

*Varieties.*—1. Scirrhus, or hard cancer. 2. Colloid or gelatinous (Alveolar). 3. Encephaloid, or brain-like (medullary) cancer. And 4. Epithelioma. When the cancer includes bony structure, it is known as osteo-sarcoma; when it displays itself upon the skin it is called epithelioma; when it involves vascularity, and is attended with hæmorrhage, it is known as fungous hæmatodes. When the growth extends to tissues endowed with nerves the pain is extremely severe. When the encephaloid cancer is endowed with pigment deposit it is called melanotic. Division

*Seat of cancer.*—The cachexia attendant on it is most marked in cancer of the internal organs. The most frequent seat is the uterus, next the mammæ, stomach, rectum, lymphatic glands; liver, brain, testes, ovary, tongue, and œsophagus, follow in order.

*Causes.*—Cancer is often hereditary; mortality increases with the age, and is later in women than in men. Causes.

*Scirrhus* or *hard cancer* is fibrous or hard, like cartilage, never attains a large size, is irregular in shape, its growth depressed, and there is puckering of overlying structures; it consists of abnormal fibrous tissue, very little fluid contents, and a few cancer cells. On *section* it is blueish white, glistening, and opaque, with fibrous bands intersecting it. Is not very vascular; and on scraping it a milky juice oozes out. It chiefly affects the mammæ, stomach, and intestines. Scirrhus.

*Colloid, Alveolar* or *Gelatinous* cancer. It sometimes forms irregular lobulated masses; consists of loose fibrous tissue, arranged as matrix, containing a jelly-like substance and a few cells, which are structureless, and have a large Colloid.



and spherical outline. On *section* roundish spaces or alveoli are seen, with fibrous walls containing a glue like colourless or yellowish substance. Chief seat, is the stomach and rectum.

**Encephaloid.** *Encephaloid, medullary, or soft cancer*, is lobulated, increases rapidly, its substance is soft and brain like; it consists of numerous multiform cells with little stroma, arranged as a matrix, which is also soft and vascular, and contains a peculiar fluid in large quantities. It develops rapidly, degenerates speedily, and becomes granular, the nuclei being set free. On *section* it appears white, somewhat vascular, soft and pulpy in the centre, studded here and there with extravasations of blood; and when pressed, a large quantity of juice oozes out. It chiefly affects the liver, kidneys, and lungs.

**Epithelioma.** *Epithelioma* is a cancer in connection with the skin or the mucous membrane, and has a tendency to spread. It commences at first either as a hard nodular swelling or as a small ulcer. It presents rugged, irregular, and indurated edges; its surface is often covered with blood, the whole mass being a villous growth. It is firm but very friable if touched, and consists of a large number of cells which alter in shape when pressed, and form peculiar concentric globes or nests with a flattened outline. On *section* it presents specks and white lines of fibrous tissue. On expression a kind of milky juice or a granular fluid presses out.

**Melanotic.** *Melanotic* is an encephaloid cancer with much pigment deposit; consist of a fibrous stroma, and cells varying greatly in number, size, and shape. The cells are of large size, of various forms, and contain one or more nuclei and nucleoli, with here and there traces of fat molecules. On pressure a juice comes out, which contains numerous giant cells, nuclei, and granules. Cancer of the heart is usually melanotic.

*Symptoms of cancer.*—*General.*—Rapid wasting, a peculiar sallow cachectic look, with a yellowish tint, gloomy and careworn countenance, great debility and irregular attacks of fever. *Local.*—There may be pain and tenderness in the tumour when touched, the functions of the organ or the tissue are interfered with; and its pressure upon neighbouring structures leads to signs of irritation and inflammation in them. Symptoms of cancer generally.

*Treatment.*—The condition of the blood should be improved, the diet regulated. Local symptoms need careful attention. True cancer is incurable when out of reach of the knife. Treatment.

*Inflammatory growths or tubercles* are best studied in relation to the organs they affect, *e. g.* lungs, meninges, mesenteric glands, under which heads a full account will be found. Tubercles.

*Syphilitic gummata* are morbid growths which resemble tubercles or inflammatory products. They undergo early caseation, and are capable of forming early cicatrices. In this condition we find gummata pervading the liver, testicles, bones, and other organs. They are also common in the skin, and the connective subcutaneous tissue; in these latter places they often undergo ulceration.

#### SCROFULA OR STRUMA

Scrofula is an idiopathic constitutional disease. It exhibits itself in a tendency to certain slow inflammations, abscesses, ulcerations; and other disorders of the skin, mucous membranes, glands, joints, and bones. It occurs in young persons, and one of its most prominent or familiar features is the tendency of the lymphatic glands to enlargement, followed by suppuration, and characterised by the moderate degree of vascular excitement attending them, with the great chronicity of their career. Scrofula. Definition. History.

*Description of scrofulous appearance.*—Considerable Description.

variety is to be found in the appearance presented by scrofulous persons, that is to say, by persons having the tendency, but not necessarily exhibiting any active morbid change. Two types exist, with every intermediate variety between themselves and between each and the perfectly healthy form it resembles.

Type

The *types* are *light* and *dark*. The *dark* is characterised by a peculiar coarseness of black hair, a coarse texture of skin, with too great shedding of the epidermis, particularly of the head, and with defective shapes occurring irregularly, as ill-shaped features or hands, or ill-proportioned arrangements of body and limbs. The other, or *fair* type, often exhibits what is called *beauty*—a fine skin, light-blue eyes, delicately chiselled features—but here, again, the disproportion which has been alluded to may generally be found in some parts. Scrofulous persons are more liable to ill-health than others, though it does not appear that their lives are necessarily shortened; they last as long, but have a lower form of vitality throughout life. Thus a scrofulous person has perhaps inflammation of the antrum with every cold; and instead of getting rid of an aural catarrh with an attack of earache, has a thickening of the tympanum and impairment of hearing.

Pathology.

Scrofula may come out, so to speak, at almost any period of life. Scrofulous signs often appear in the child after the reduction of the constitution due to an acute disease, such as measles. Scrofula lies latent in the constitution, and may be brought to the surface by untoward circumstances. Want of food, bad lodging, in those who have been before well fed and housed, may show that it exists where it was before unsuspected. Age, by lessening all the powers of the body, sometimes causes a scrofula to appear, which the fortunate surroundings of affluence have prevented appearing during youth and middle life.

Causes.

*Causes.*—A scrofulous constitution is, in the vast majority

of cases, hereditary and congenital, but the morbid processes which are associated with it most often appear in childhood and youth, or in some members of a scrofulous race may never appear at all. As to the causes of scrofula nothing minute has been determined, but it is proved beyond doubt that long-continued bad food, bad air, and bad lodging, will produce it. Thus it is very common in Europe among Jews, whom the intolerant regulations of the dark ages compelled to dwell crowded together in particular quarters of towns. In India the practice among the poorer Hindoos of living huddled together, and very many sleeping in one room, leads to the same result. Many of the Highlanders of Scotland and of the Swiss, owing to the hardships of their life and an uncertain supply of coarse food, and narrow, ill-ventilated rooms, exhibit scrofula. That it may also be produced in the offspring by the wreck of the constitution caused by dissolute life is beyond dispute. The soldiers of the armies of the Commonwealth in Ireland, freed from the severe restraints which their creed and associates imposed upon them in England, and made rich by the grants of lands which they received instead of pay, in many cases led lives of unbridled dissipation. The scrofulous constitution of many of their descendants may be observed in that country. Close intermarriages, a practice still prevalent in India, by intensifying any scrofulous trace, undoubtedly tend to the development in children of a scrofulous constitution. The relation between syphilis and scrofula is undetermined, but there is no doubt that the venereal poison, reducing as it does the general healthiness of all the tissues, tends to promote the development of scrofula in descendants.

*Symptoms.*—Irregular scars, often reddish in colour, in young persons on the sides of the neck are certain marks *Symptoms.*



of scrofula. They are the remains of those long-lasting unhealthy suppurations of the lymphatics which are due to no other cause. Similar scars on the face and other parts of the skin, that affection described as blear-eyed, nails twisted, or any other signs of necroses not due to injury, some varieties of eczema, of pityriasis, of otorrhœa, are also symptoms of scrofula.

A famous portrait of Dr. Johnson, by Sir Joshua Reynolds, now in the National Gallery of London, is a perfect example of the scarred face produced by scrofula and of the affection of sight which is sometimes associated with it.

**Treatment.**

*Treatment.*—Scrofulous children should be very carefully brought up, so as to prevent, as is possible, any of the morbid changes arising to which their constitution is liable. They should be warmly clad, carefully fed, and have frequent change of air. Besides the local remedies, such as iodine, for enlarged glands when they occur, the chief treatment lies in cod-liver oil, phosphate of iron, and above all, fresh country air. A very scrofulous mother had better not suckle her infant if wealthy, but should provide it with a strong wet-nurse. The unsightly scars in the neck may be prevented by drawing off the pus with an aspirator or by other careful surgical procedure.

### RACHITIS—RICKETS.

**Rachitis or  
Rickets.**

**Definition.**

**Characters.**

*Rickets* is a general and constitutional disorder due to imperfect nutrition. It occurs as a cachexia in infants who, upon learning to walk, show bending or softening of bones, muscular debility, and failure of general nutrition. The bones are brittle, imperfectly developed, the limbs crooked, and the spine curved. Teeth appear late and fall out early.

**Causes.**

*Causes.*—It is a disease of infancy, occurring during the first or second year, either just before or while cutting

teeth, rarely before that time. Children fed improperly, artificially, or brought up by hand, and those in whom suckling has been continued long after the proper time, get rickets. All imperfect hygienic conditions in infancy tend to induce the disease.

*Symptoms.*—The onset is gradual, preceded generally by a disturbance of the alimentary canal and fever. The child becomes dull, peevish, and irritable, and refuses to play or to be amused. At the commencement it complains of pain on moving, is restless at nights, and has an enlarged abdomen. Though rickets is a chronic complaint, wasting is not common. Profuse sweating about the head and neck occurs during sleep, the other parts of the body at the same time remaining hot and dry. The child throws off the bed-clothes at night to get himself cool, and passes copious urine containing phosphates, the urea and uric acid being deficient. Those cases are only fatal where rapid wasting takes place.

In well-established cases, the child sits in a heap in its mother's arms, with its back bent outwards and shoulders drawn up; the head is large and ill-supported, the frontal eminences prominent, the fontanelles widely open; there is enlargement of the ends of the long bones; the teeth are late in appearing, and decay soon; the central lower incisors appear as late as the tenth or twelfth month. The bones are soft, and bend readily under pressure, often leading to green stick fracture; sometimes the knees are bent inwards (knock-kneed); very often the tibia is bent outwards and forwards (bow-legged); the chest is pigeon-breasted, narrow from side to side, and sternum thrust forwards. The epiphyses of the extremities are enlarged. The ossification of the epiphyses of all the bones is delayed and imperfect, hence curvature and angular deformity. The ribs are beaded where they join the costal cartilages, and the vertebræ enlarged at their epiphyses.

Complica-  
tions.

*Complications.*—Children so affected are liable to dyspepsia, intestinal and pulmonary catarrh, eczema, bronchitis, laryngismus stridulus, and convulsions.

Prognosis.

*Prognosis.*—Unfavorable only where the deformity is very great, and there is much loss of vital powers. Fatality increases with the complications and chiefly depends on them.

Diagnosis.

*Diagnosis.*—The rickety child is pained when it puts its legs to the ground, and therefore refuses to walk; this symptom often leads to confusion with infantile spinal paralysis, with rheumatism, with chorea, and with hip-joint disease. The state of the muscles, and their action to electricity, exclude paralysis; the normal temperature, rheumatism; the non-affection of the hand, chorea; while the usual method of examination will satisfy the physician that hip-joint disease is not present.

Treatment.

*Treatment.*—Attend to the diet. The breast should be given at regular intervals, and only for a certain time. The child should be weaned at once if suckling has been too long continued. Feeding by the breast only for the first eight months of life after birth, from the mother if she be healthy, or from a vigorous wet-nurse. After the eighth month, farinaceous food, good beef-tea, or gravy out of a joint of mutton. Some weeks later yolk of eggs, custard pudding, or underdone mutton may be tried. The child should be warmly clad with flannel next the skin. Fresh air, and sea baths, are useful. It is a mistake to pause in the general treatment on account of complications. Cod liver oil steadily given for a considerable period will almost always cure rickets.

## SYPHILIS.

Syphilis.

History.

*Syphilis*, medically, may be considered in two aspects, as it affects adults, and as it is found in children.

In adults it may be primary and secondary, or local and constitutional. Constitutional syphilis is a blood poison, and manifested in a variety of ways. It is produced from direct inoculation, and is transmitted from one individual to another, often resulting in a specific sore which is indurated in character; the neighbouring lymphatic glands being hard and enlarged, and seldom suppurating. This form gives rise to secondary conditions, impairs the constitution for life, and often transmits the taint from generation to generation.

*Symptoms.—Stages.—Incubation.* After inoculation there is an interval known as the period of incubation; this varies from six weeks to about three months. During this time the poison does not manifest itself. *Invasion.* During this period the patient suffers from languor, pain in the bones, which is more intense at night, loss of flesh, impaired digestion, and general anæmia. *Eruptions.* These may be simple papules, scales, vesicles, and pustules or tubercles. They are of a peculiar coppery colour, and soon developed from a mere redness, are best seen on palms of the hands, soles of the feet and on the bends of limbs. Besides eruptions there are growths (warty) about the genitals, and even ulcers in the throat and over the tonsils. These ulcers are generally abruptly cut, not painful, and not spreading. There is also a slight abrasion or peeling off of the mucous membrane of the mouth, palate, pharynx, and larynx. Loss of hair (Alopecia) is common, so are also mucous tubercles or condylomata where the skin joins the mucous membrane. These growths either become completely absorbed or shrink and remain, leaving a deep cicatrix or undergo suppuration or ulceration and are thus removed.

*Congenital Syphilis* is a disease occasionally manifested at birth, more commonly at from one week to six weeks after birth; rarely as late as at six months, but in excep-

Symptoms.  
Stages.

Incubation.

Invasion.

Eruption.

Growths.

Congenital  
syphilis.



tional cases symptoms directly ascribable to hereditary syphilis have been known to appear so late as twelve or fourteen years, and at every intermediate period.

Symptoms.  
Skin.

*Symptoms.*—A *tawny-coloured* appearance of the skin over one eye is frequently the first manifestation of disease; there is anæmia, pallor of the skin, retarded growth; the muscles are flabby, the skin dry, rough, and hanging loosely, the cuticle generally desquamates. The face appears muddy looking, decrepit, and shrivelled, as if careworn and aged; depression of bridge of nose and expansion of alæ nasi; eruptions of a moist kind break out on palms of the hand and soles of the feet or around the bends of the arms or thighs, or over the genitals. Sometimes these appear as yellowish hard scale-like patches, which on separating leave ulcers. The mucous membrane at the angles of the mouth also becomes inflamed and ulcerated, often the seat of tubercles or condylomata; ulcers and condylomata are also seen where the skin joins the mucous membrane.

Face.

Mucous  
membrane,

Voice.

Teeth.

Transmission

Cracks and fissures and condylomata are common about the anus; also white patches on the roof of the mouth and hard palate. The voice or cry of the child is peculiarly hoarse and snuffling, and appears in forty-eight hours after birth. There are also nasal discharges, which often clog the nostril and interfere with breathing, and which are nearly always associated with disease of the nasal bones. The child soon begins to waste. The teeth are said to present certain peculiarities. The temporary incisors are cut early, but crumble speedily away. The permanent ones are short, peggy, deformed, and rounded at the angles, separated by a gap or turned towards each other; with edges jagged, and having a vertical notch, with a shallow groove running up to the gum in front and behind. The disease may be transmitted to the mother by the foetus or to the third generation; or it may be trans-

mitted to the child through the milk, from a syphilitic nurse, or from a syphilitic child to the nurse through the saliva, thus inoculating the poison into the nurse's breast.

*Diagnosis.*—*From rachitis.*—In rachitis the characteristic eruptions on the skin and on the face, are absent as are mucous tubercles about the anus and angles of the mouth. Syphilis develops in first six weeks after birth, while rachitis is not observed until towards the end of the first year. Tawny-coloured patches and psoriasis are only found in syphilis. Diagnosis.

*Treatment.*—Mercury and iodide of potassium are rapidly effective. Tonics and cod-liver oil may also be added in the advanced stage. Mercury is administered with advantage as an inunction. Treatment.

## RHEUMATISM.

Rheumatism.

*Rheumatism* is a constitutional disease of which the characteristic symptoms are pain and swelling of the joints, or pain in the muscles and bones. Definition.

*Pathology.*—The explanation usually given of the phenomena of rheumatism is, that it is due to lactic acid. This poison is a normal ingredient of the ordinary urinary excretions, but in consequence of some derangement it is retained within the body and circulated in the blood. The blood thus contains superabundance of this acid, which is supposed to be formed in the pulmonary circuit of the blood, and thence carried through the left ventricle into the general circulation whence it is propagated to the diseased parts. During this disease the fibrin of blood is in excess over the salines. It has been suggested that starchy food becomes converted into lactic acid; that starch during health, combines with oxygen and forms carbonic acid, and is thus excreted by the lungs, and that when this Pathology.

oxidation becomes defective the lactic acid accumulates in the blood and is manifested in the joints. The disease has a predisposition for the white fibrous tissue, of fascia, fibro-serous membranes, ligaments, and joints.

Varieties.

*Varieties.*—1. Acute articular rheumatism, or rheumatic fever, in which are included those milder forms sometimes termed subacute rheumatism. 2. Chronic rheumatism, which attacks joints and sheaths of muscles. 3. Syphilitic rheumatism. 4. Destructive arthritis or arthritis deformans.

### ACUTE RHEUMATISM.

Acute rheumatism.

*Acute articular rheumatism* or rheumatic fever is a formidable disease, owing to the suffering it causes, the occasional intensity of the fever, and the damage it frequently inflicts upon the heart. It is an inflammation affecting the fibrous, fibro-serous, or synovial structures in the body. It seldom goes on to suppuration and is frequently apt to change its seat (metastasis) and affect at times many, if not all, the internal organs. The attacks may be slow and lingering or very sudden. One or more joints may be affected.

Causes.

Predisposing.

*Causes—Predisposing.*—The disease attacks persons of age though most common in its acute form from sixteen to thirty, and in its acute forms after forty. Persons who work out of doors in variable climates are most liable to it, and the strongest predisposing cause is a previous attack.

Exciting.

*Exciting.*—A sudden chill produced by exposure to cold and damp, especially when the clothes are wet from perspiration, errors in diet, scarlet fever, gonorrhœa, and the puerperal state are the chief exciting causes.

Symptoms.

*Symptoms.*—Sometimes the symptoms come on suddenly with high fever and elevated temperature, or chills and rigors followed by fever, and after a few hours or a day or

two inflammation of the joint or joints occurs. Sometimes the patient may have long suffered from slight rheumatic pains in the localised parts of the body, as flying pains about the limbs or pains in the nerves-sheath, and in the course of these pains acute attack comes on. There is at first a feeling of coldness, with want of appetite, thirst, and fever, soon followed by affection of the joints. There is pain, stiffness, and soreness of the joints, and weariness and restlessness to move them, and soon the affected *joints* become swollen, hot, red, painful and excessively tender. The swelling is often due to inflammation of the tissues round the joints, and to effusion into their interior. The large joints are chiefly affected, very often in succession. In many cases the same joint may be attacked more than once in the course of the disease; in other cases the affection of joints is symmetrical. A dull aching pain is felt in the joint, which increases on making any movement. There is no enlargement of superficial veins over the joints, nor any desquamation of the skin such as is found in gout. The pyrexia is considerable, lasting for about eight or ten days. The pulse is full and quick. The temperature ranges from  $100^{\circ}$  to  $104^{\circ}$ , rising at times to  $109^{\circ}$  or  $110^{\circ}$ . Sometimes there may be rigors. The skin is covered with an acrid, copious, and sour-smelling perspiration. The urine is scanty, high coloured, and loaded with urates. The urea being also in excess the chlorides are generally deficient or absent. The bowels are confined, the tongue is covered with white fur but is usually moist. Delirium is not usually observed unless there are complications. Unfavorable cases are of three kinds,—those in which the danger is due to pyrexia: another set in which the complications become grave: and a third in which the danger is not of death, but of the disease passing into arthritis deformans.

Joints.

Fever.

Unfavorable cases.

When the fever is less distinct and the swelling but



Subacute  
Rheumatism.

slight, the case is said to be one of Subacute Rheumatism, but it is most important to bear in mind that such cases, especially in children, are by no means secure from the most formidable complications of the disease.

Complica-  
tions.

*Complications.*—These often come on insidiously and must therefore be looked for in every case. The complications are—1. Cardiac inflammation. Pericarditis, endocarditis, both of which are accompanied by some degree of myocarditis. 2. Lung affections. Pleuritis and pneumonia. 3. Functional nervous disorders. Chorea, is the most singular complication of all; half the number of cases of chorea have been preceded by rheumatism. 4. Tendency to metastasis; inflammation suddenly leaving one part and reappearing in another. 5. Two skin diseases are associated with rheumatism, that is to say, occur after attacks or in persons liable to attacks, *erythema nodosum* and *herpes zoster*. 6. Iritis occurs in some cases, and if it has once occurred it is likely to complicate every succeeding attack.

Terminations

*Terminations.*—Recovery usually takes place in from three to six weeks, but relapses are frequent and permanent organic mischief is very often left behind.

Prognosis.

*Prognosis.*—In acute rheumatism, so far as immediate recovery is concerned, is good. Death does occur from the causes indicated above, but such cases are rare; and it is the rule that even the most severe complications do not kill the patient. No disease, however, more frequently leaves results which are likely to shorten life. The vast majority of cases of valvular disease of the heart may be traced to an attack of acute rheumatism.

Diagnosis.

*Diagnosis.*—Gout and Rheumatism have many features in common, but differ in the points given in the table which follows.

If uncertain whether a swollen joint is due to rheumatism or gout it is a good plan to put on a very small blister. The fluid from this is to be collected in a watch glass in

which a thread is laid. If after evaporation crystals of uric acid are seen adhering to the thread (under the microscope) the swelling is a gouty one.

	<i>Rheumatism.</i>	<i>Gout.</i>
Predisposition	Hereditary seldom or never	Hereditary as a rule.
State of life...	Disease of poor and hard working whether or not ill fed	Disease of high life.
Age .....	Between 15 and 25	Between 30 and 40; never before puberty.
Sex .....	In males and in females	Common in males.
Cause .....	Generally from exposure to cold	Preceded by deranged stomach; no obvious cause.
Joints .....	Medium-sized or large metastasis common; pain duller, or only acute on pressure; no desquamation; no chalky deposit	Small, chiefly the great toe; no metastasis; intensely painful; œdematous; swollen; shining; superficial veins enlarged; desquamation after a time, resulting in permanent enlargement, distortion, and chalky deposits.
Fever .....	High and continuous	Much constitutional disturbance, and considerable morning remissions.
Sweats .....	Profuse and acid	Nothing peculiar.
Duration and course	Uncertain; relapses frequent, not periodic	Short; relapses common, periodic
Complications	Inflammation of the lungs and heart	Morbid conditions of the stomach, bowels, kidney, and brain, and functional diseases of heart.
Blood .....	Uric acid absent; tophi absent	Uric acid in blood, and old clots in auricles of heart.
Urine .....	Scanty; urates large quantity; albumen sometimes	Urates less in urine passed just before and during fit; urates excess in interval; albumen and casts.

Treatment.—  
General.

*Treatment.*—A comfortable bed and flannel, or cotton wool wrapped round the joints are essential to the patient's ease. It is best to lay him in blankets as his sweating makes him very liable to take cold. A diet of solid meat ought not to be given, and must be resumed with very great care as convalescence advances.

Drugs.

*Drugs.*—Internally, specifics for the joints are alkalies, lime-juice, colchicum, bromide of ammonium. For the relief of fever aconite, veratria, and digitalis; to relieve pain opiates. Salicin in fifteen-grain doses, salicylic acid, and their various preparations, often act in relieving pain and subduing fever; large doses of quinine, and even stimulants, may sometimes be given with benefit. Small doses of podophyllin relieve constipation. Senna may be frequently administered, and the administration repeated, and purgatives may, as a rule, be continued as long as the stools are dark coloured. A tincture of iron is a valuable remedy, and may be given immediately the fever has subsided. Some recommend iodide and others bromide of potassium, others, again, give nitrate of bicarbonate of potash very frequently, others guaiacum.

Local.

Locally: to the joints flying blisters, followed by poultices; warm and anodyne fomentations often give marvellous relief. If there be any stiffness, apply iodine paint or repeated blisters, or strapping with mercurial and ammoniacum plaster. It has been asserted that the heart is most often implicated during the first week of the disease, when the fever is high and the urine acid, and not when the urine is alkaline, hence alkalies should be used steadily till the fever subsides and the urine is rendered alkaline. If, in despite of our precautions, sudden cardiac pain occurs, with frequent pulse and sense of oppression, apply leeches, cupping glasses, blisters, or poultices, over the præcordial region.

## CHRONIC RHEUMATISM.

*Chronic rheumatism* is a separate constitutional affection, but is sometimes a sequel of acute rheumatism. It is common in old age.

*Divisions.*—1. *Chronic articular rheumatism* occurs as a sequel of acute, or after exposure to wet and cold. It affects the fibrous sheaths of nerves and the fibrous structures around the joints. The joints thus become thickened and stiff, causing movement to be impaired. The pain is often worse at nights after exposure to cold, or during the cold weather, it is also apt to exhibit exacerbations. The affected joint is not altered in form. 2. *Muscular and tendinous rheumatism* (myalgia) affects the fibrous aponeurotic sheaths of muscles, tendons, fasciæ, and periosteum. It is a common complaint among out-door labourers, and is very intractable. It has several varieties. *Cephalalgia* affects the scalp; there is headache, with soreness in the head, which is increased by movement and on pressure, and the muscles which move the head are stiff. *Torticollis* or stiff neck affects one side of the neck which is immovably twisted to that side. *Pleurodynia*, is a stiffness of the chest walls, and chiefly involves the muscles of the left side. The pain often interferes with respiration, coughing, and sneezing; is sometimes fixed in one spot, and relieved only on diffuse pressure. *Lumbago* involves the muscles on both sides of the lumbar region. Its pain is very severe, with constant aching and stabbing, increased by movement and by heat, as well as by pressure.

*Symptoms.*—The pain is first felt suddenly at night. Both the voluntary and the involuntary muscles become extremely painful, stiff, and tender, and there is difficulty in moving the limbs. Application of heat increases the pain,

Chronic  
rheumatism.Divisions.  
Chronic  
articular  
rheumatism.Muscular  
rheumatism.Varieties of  
muscular  
rheumatism.  
Cephalalgia.

Stiff neck.

Pleurodynia.

Lumbago.

Symptoms.



but steady pressure relieves it. There is no fever ; complications do not occur.

Treatment.  
of chronic  
rheumatism.

*Treatment*—Locally : keep flannel next the skin, avoid exposure to the draughts and alternations of temperature. Use baths with various preparations, such as sulphur, alkalies, or hot steam or vapour ; cold douches, stimulating and anodyne liniments, shampooing and kneading, aided by strapping and blisters ; even dry cupping is useful, Internally : use various vegetable tonics, iodides and bromides, various alkalies, guaiacum and sulphur, and cod-liver oil. In *muscular rheumatism* keep the affected part at perfect rest. Some use acupuncture over the affected part. In the early stage free purgatives and diaphoretics, and when the complaint becomes chronic iodide of potassium, hydrochlorate of ammonia, guaiacum, sulphur, arsenic, various preparations of balsams, mezerium, colchicum, may be given.

### GONORRHOEAL RHEUMATISM.

Gonorrhœal  
and syphilitic  
rheumatism.

*Gonorrhœal rheumatism* is a variety of chronic rheumatism, due to the absorption of its poison into the blood. That it is related to the discharge is shown by the fact that the patient never gets rid of the pains while even a gleet remains. *Syphilitic* rheumatism has a similar relation to the disease it accompanies. In gonorrhœal rheumatism the patient is of debilitated constitution, and the knee-joints, ankles, soles of the feet, and hips become rheumatic on exposure to cold. In gonorrhœa, generally one joint is affected and continues so throughout the disease. In syphilis long and flat bones are affected, and between the joints, not at them. Generally there are nodes or periosteal inflammations. There is considerable pain with tension and swelling of the affected joints, but no suppuration. The joints are also stiff and crackle on movement ; very often they

Symptoms.

become ankylosed, owing to the cartilages being destroyed. The attack is very apt to recur.

*Treatment.*—Rest and fomentations to the joint, and to avoid ankylosis the joint should be kept extended and on a splint. The gonorrhœa or syphilis must be treated on general principles. Treatment.

### ARTHRITIS DEFORMANS, OR NODOSITY OF THE JOINTS.

*Rheumatic arthritis deformans*, is a form of subacute or chronic inflammation of the joints. It is of a greater severity than an ordinary chronic rheumatism, and it leads to effusion in the joints with permanent maiming or lameness. In this affection the inflammation ends in deformity. Thus the complaint resembles gout in a few of its characters. It occurs in persons, mostly females, who are weak and debilitated, and who have indulged in excesses, generally between twenty to forty years of age, and who are exposed to damp or cold or alternations of temperature. Arthritis deformans.  
Definition:

*Symptoms.*—The disease sets in abruptly with fever and general disturbance, or commences with languor, restlessness, and deranged secretions. The joints become stiff, red, painful, and swollen; while the synovial fluid is much increased within them. If the fluid be abundant, fluctuation, with a distinct crackling, may be felt. There is wasting of muscles in connection with the diseased joints, and general debility. Gradually the capsular ligament becomes thick and the fluid thin and diminished in quantity. As the case progresses the internal ligaments become destroyed, and the joint appears ankylosed or quite disorganised. At this time changes also take place within the joint; the fibrous bands which form the interarticular fibro-cartilage and the cartilages covering the ends of bones Symptoms.

are all destroyed, and the ends of bones appear smooth and enlarged, although there are no deposits of urates such as are found in gout. If the hip, knee, or ankle are the parts affected there is lameness.

Varieties.  
Acute.

Chronic.

*Varieties.*—It may be *acute* or *chronic*. *Acute.*—In the early stage several joints are affected and the fever is high. In the *chronic* form it may begin with swelling and pain of only one joint, which soon recovers, but is followed by a relapse. During relapse the same joint becomes again affected, and remains permanently altered and useless. Gradually other joints become attacked in the same way in succession, till ultimately they also become rigid, motionless, and permanently bent or extended; there is considerable amount of distortion and nodulation of the joints and wasting of muscles; the patient thus becomes completely crippled. The hands are injured before the feet. The pain is often worse at nights.

Treatment.—  
General.

Local.

*Treatment.*—General. Improve the state of general health, attend to hygienic conditions, and give good liquid and nourishing diet, and stimulants if necessary. In the early stage warm clothing, equable climate, and moderate exercise aid greatly towards a cure. Tonics, mineral waters, and baths are also beneficial. Locally,—use strapping, anodyne applications, and galvanism. The maintenance of the joints in one position by suitable appliances is useful. Some recommend burying the affected joints in sand at the temperature of 150°.

## GOUT.

Gout.  
Characters.

Gout, otherwise called podagra, is a paroxysmal disorder, which is more or less persistent and attended with deposition of urate of soda in the cartilages and other textures of joints. It is a specific inflammation of a constitutional origin and is distinctly hereditary. It is believed

to be due to the excess of uric acid or urate of soda in the blood, and has a tendency to relapses after variable intervals.

*Causes.*—*Predisposing.*—The disease is hereditary, developing in males more than in females, generally between thirty and thirty-five years of age, seldom later. Plethoric people and those addicted to high living, publicans, butchers, butlers, and persons working in lead: those living in cold, damp, and changeable climates are more readily attacked than others. Free use of beer and wine predispose to gout. *Exciting.*—Exposure to wet and cold, great fatigue, mental emotions, and various excesses.

Causes.  
Predisposing.

Exciting.

*Pathology.*—There is excess of uric acid in the blood. The urea being more highly oxidized than uric acid, any deficiency of oxygenation of blood leads to an increased amount of uric acid unchanged. Imperfect action of the kidneys induces the same accumulation; if the uriniferous tubules become plugged by the deposit of urates within them, the urates accumulate in the blood, and depositing in a joint or joints lead to gout. In the commencement of the disorder the uric acid is found only in the blood and in the serum, but in advanced cases it may be detected in the fluid of blisters in the dropsical accumulations, and even in serous effusions. A deposit of urate of soda is also generally detected in the affected joints. At first the affected joint is swollen and vascular, but after various recurrences there is tendency to form a deposit in the shape of fine crystalline needles in the superficial part of the cartilages, spreading subsequently over the fibro-cartilage, ligaments, and synovial membranes, and even over the entire surface of the joint. The joint thus becomes stiffened and ankylosed. In old persons it often becomes distorted and the skin over it ulcerated, exposing chalky-looking masses to view.

Pathology.

Joint.

*Varieties.*—*Regular* or articular gout and *Irregular*, non-

Varieties.



articular, or retrocedent or misplaced gout. The *regular* variety has been further subdivided into acute and chronic gout.

Morbid  
anatomy.

*Morbid anatomy.*—The lesions are chiefly found in the joints and the tissues which surround them. In the early stage the superficial portions of the articular cartilages are here and there covered over with opaque white patches. Later on the cartilages become more and more infiltrated, and appear as papular chalky-looking deposits on those surfaces of the bones which form the joints. In far advanced cases the synovial membranes, the substance of the soft tissues surrounding the joints, the bursæ, and even the cancellous tissue of the neighbouring bones become involved. In many cases the cartilages, owing to their infiltration, have lost their vitality and become brittle, and are gradually removed, leaving the denuded bone beneath. Sooner or later the bones also undergo destructive changes. These mortar-like deposits gradually lead to erosion of the tissues which covers the joints, and finally an opening is made by which they escape. The deposit, if analysed, will be found to consist of clusters of needle-shaped opaque crystals of urate of soda. The deformities and other changes most frequently occur first in the joints of the hands, then in those of the feet; they next affect the wrists, and so on invading the other joints. In gout the internal organs also undergo degenerative changes; thus degeneration of the arteries of the heart, emphysema of the lungs, cirrhosis of the liver, and contracted granular kidneys are common.

Symptoms.

*Symptoms.*—It must not be forgotten that in cases of gout deposit takes place in the cartilages of joints long before inflammation of the joint occurs, and hence acute gout is preceded by premonitory symptoms, these are heartburn, flatulence, deranged digestion, disordered liver, palpitation of the heart, and various nervous dis-

turbances ; asthma, urticaria, or sudden alteration in the quantity of urine, which may become either scanty or profuse, and loaded with lithates. The attack sets in suddenly. The patient is roused from sleep all at once between one and five in the morning by a severe pain in the metatarso-phalangeal articulation of the great toe of one foot, or of both feet at the same time, or the pain may commence in the thumb, or in the heel or instep. The pain is so agonizing that the patient cannot move the affected limb, and even the pressure of the bed-clothes increases the pain. There is a slight rigor, followed by fever and restlessness, the bowels are constipated, and the urine is loaded with urates, phosphates, and even albumen. Towards the dawn the patient perspires, and then falls asleep, partly from exhaustion and partly from a slight remission of the pain. On waking from rest he finds the joint which ached in the night to be much inflamed, swollen, and tender, the skin over it tense and shining, and the superficial veins of the foot enlarged. The patient continues comparatively well till the next night, when the previous symptoms reappear, followed by remissions as before. This state continues for about eight or ten days, when the fever, pain, and acute suffering pass away. Being once affected the disease extends gradually from one to several joints of one or both the feet or hands. Sometimes several joints become affected simultaneously, or may follow one another in succession. In some patients one single joint becomes affected in the course of several successive attacks.

*Characters of joint.*—The joint is red, hot, and tender at first ; gradually as acute symptoms subside, the skin becomes of a dusky hue and is tense and shining and œdematous, pitting on pressure. The superficial veins continue enlarged. The pain is described to be burning, tearing, boring, or piercing, as if a red-hot wedge were

Character  
of joint.

being driven into the joint. It is worse at night, remitting towards morning or during some part of the day. As the inflammation subsides itching, followed by desquamation of the cuticle, occurs. In strong persons, and in cases where several joints are at once affected, the fever is very high, and often preceded by chills; The patient complains of restlessness and sleeplessness. The urine is scanty, dark coloured, with copious deposit of urates, the uric acid being generally deficient.

**Termination.** *Termination.*—The disease ends favorably in critical sweats, or diarrhœa, or in copious flow of urine, with abundant sediment of urates of soda.

**Duration.** *Duration.*—It may last from four to five days, or may continue for several weeks, with remissions and intermissions. Recurrences are extremely common. With each recurrence the succeeding paroxysm generally becomes longer, and the interval between it and the next shorter, till at last the patient is only free from the attacks for a few weeks in the summer.

**Chronic gout.** *Chronic Gout.*—In this affection either only one joint or a number of joints at a time become implicated. Those joints most frequently affected suffer most severely, and gradually they become permanently altered in structure and form. The patient is crippled. The disease is chronic in its duration. In the early stage the joints are stiff, enlarged, nodulated, and deformed, owing to the deposit of urate of soda in their structure. The skin over them is blue and congested, the veins enlarged, the surface often ulcerated. In some cases exposed masses of chalky deposit (urate of soda and calcium) or tophi (sandstone) are observed. When the disease has long continued other structures within and around the joints, such as ligaments, tendons, sheaths, and aponeuroses of muscles become deformed, although there may be no deposit of urate of soda and calcium within them.

*Retrocedent* or misplaced gout is a diathesis in which some internal organ is affected, as the stomach or heart. Such attacks are violent and threatening to life, but generally brief. A gouty foot when exposed to cold may produce a metastasis to an internal organ. Retrocedent  
gout.

When the stomach is affected there is nausea, vomiting, and spasm or cramp, which, if not relieved, are soon followed by prostration. When the heart is affected, palpitation, distressed breathing, pallor, faintness, and debility are the symptoms. Very often chalky deposit invades the kidneys; being deposited within the tubules, and subsequently in the intertubular substance, and leading to the contracted, indurated, or gouty kidney.

*Diagnosis.*—Rheumatism is the only disease with which gout is likely to be confounded, and the details already given under the heading of Rheumatism are sufficient. Diagnosis.

*Complications and sequelæ.*—Chronic Bright's disease with granular kidney is a frequent complication, and perhaps a result of gout. Deformity of joints often remains. Complica-  
tions.

*Prognosis.*—In acute cases the danger increases with the metastasis. In the young subject, and in those in whom it is hereditary, more than one joint becomes affected. In chronic cases the prognosis is very unfavorable, owing to the non-elimination from the blood of uric acid, and also to the presence of urates in the uriniferous tubes of the kidney. In a confirmed or established case of gout, if any acute disease supervenes, or if even any injury or wound takes place, the chances of recovery are slight. Prognosis.

*Treatment.*—*During the attack.*—*Locally.* Keep the joint at perfect rest and in an elevated position; wrap it up in cotton wool, and cover it over by cotton wool and oiled silk to keep it warm; also apply anodyne fomentations. The erroneous application of a leech to the affected joint has Treatment.  
During the  
attack.  
Local.



Constitu-  
tional.

During the  
interval.  
General.

Local.

been known to lead to great prolongation of the disease. When the inflammation has subsided use gentle friction, bandages, and even elastic stockings. If there is fear of metastasis to the internal organs, at once excite inflammation in the joints by friction, heat, and sinapism. *Constitutionally.* In the commencement have a free action of the skin and bowels. The pain and restlessness may be relieved by anodynes. The diet should be low but nourishing; stimulants must be avoided if possible. *During the interval.—General.* Avoid all predisposing and exciting causes. The diet should be nutritious, liquid and digestible; the nitrogenised and saccharine constituents of food should be sparingly used, the hours of meals regulated, and malt liquors and strong wines avoided. Light brandy and wines, largely diluted with water, may be taken occasionally. Careful attention must be paid to all hygienic laws. The patient's room should be properly ventilated; he should take exercise in the open air, have baths, friction to the joints, and warm clothes next to the skin; indulgences and excesses of any kind, must be avoided, and also exposure to the sudden alterations of temperature and to wet and cold. If the stomach or the liver be at fault, regulate them by suitable measures. Mineral waters, such as those of Vichy, Carlsbad, Ems, and hot sulphur baths as at Vajee rábai, near Callian, in the Bombay Presidency, have proved beneficial in a majority of cases. Various drugs, as colchicum, quinine, sarsaparilla, cinchona, guaiacum, various alkalies, and earthy salts, as lithates, have each been tried in its turn with good results. *Locally* to the joints, shampooing, alkaline lotions, friction, and strapping, may be used with success.

Goitre.

#### GOITRE.

Definition

Goitre (from *guttur*, the throat), called also bronchocele, is a swelling over the windpipe, due to an hypertrophy of

the normal constituents of the thyroid gland. The swelling often attains a considerable size, but is usually painless. It is sometimes soft and sometimes hard. It may affect the whole of the gland, or only its central portion, or its one or the other side; the right side is more frequently affected than the left. It is common in Switzerland and in countries bordering upon it. In Derbyshire, Nottinghamshire, and Yorkshire, cases are met with and known as Derbyshire neck. Characters.

*Causes.*—It is more common in females than in males, uterine derangements often produce it. It is often congenital, or begins at an early age—a marshy soil, absence of the sun's rays, unfavourable hygienic conditions, and intermarriages among close relations—all conduce to its production. Causes

*Pathology.*—The poison is said to be conveyed through water containing malarial influence and lime, iron, copper, lead, and magnesia or salts of sulphur. Such a water being used for drinking purposes leads to Goitre. Pathology.

*Symptoms.*—The patient complains of throbbing of the vessels over and around the tumour; of dyspeptic symptoms, as vomiting; of depression of spirits; often of deafness and pain in the teeth. It is attended with serious symptoms from pressure of the tumour over the trachea and the œsophagus, over the large veins and over the sympathetic, pneumogastric and recurrent laryngeal nerves. Symptoms.

*Treatment.*—Remove the patient to another locality, regulate any uterine derangement, and attend to the condition of drinking water and to hygienic laws in general. Preparations of iodine, such as ointment of iodide of potassium, iodide of ammonium, bromide of potassium may be applied locally. Iodide of mercury ointment—16 grains of mercury to 1 ounce of lard has been used as an inunction. Treatment.

## EXOPHTHALMIC GOITRE.

Exophthal-  
mic goitre.  
Subjective.

*Exophthalmic goitre* (Basedow's or Graves' disease).  
—Occurs in young persons, and is characterised by 1. peculiar painless enlargement of the thyroid gland : 2. protrusion of the eyeball : 3. palpitation of the heart : 4. a loud systolic murmur (anæmic) is occasionally heard, and 5. pulsation in the thyroid body. Besides the protrusion, there is constant and involuntary motion of the eyeballs, and short-sightedness.

Causes.

*Causes.*—The exophthalmos is said to be due to the distension of the intra-orbital vessels pressing the eyeball forwards ; to serous infiltration into the areolar tissue behind the globe ; and to increased fat in the orbit.

Pathology.

*Pathology.*—Some believe the disease to be a neurosis associated with determinations of blood, and thus account for disturbance in other regions which are supplied by branches from the sympathetic. The disease is generally chronic.

Symptoms.

*Symptoms.*—Both eyes are generally affected. The eyeballs are often very incompletely covered by the lids, and a destructive inflammation occurs from their continued exposure to air. There is no pain, the tumour is simply inconvenient by its bulk, and the serious symptoms are due to pressure on large veins, pneumogastric nerves, and œsophagus or trachea. Under the least excitement the pulse rises from 90 to 130. The patient often suffers from giddiness, faintness and sleeplessness, and deranged digestion.

Objective.

*Objective symptoms.*—Inspection : the tumour is situated just on the top of the sternum, on each side of the trachea, more bulged out on the right than on the left side. Palpation : the tumour pulsates. Auscultation : there is a vocal thrill and a bruit, loudest with the systole.

Treatment.

*Treatment.*—Remove the patient to another locality. Attend to conditions of the system, whether syphilitic, scrofulous, or simply anæmic. Give nourishing diet, and

reduce the local congestion by applications, such as ice ; calm the action of the heart, and diminish the force of arterial pulsation by digitalis given in full doses. Belladonna with iron has been tried, but others avoid iron, as with a pulse of 120 it may augment general distress, and give rise to dyspnœa. The disease is usually fatal in course of time.

### CRETINISM.

Cretinism.

This affection is supposed to have a close connection with goitre. It is a sort of idiocy accompanied by imperfect development of the head and deformity of the bodily organs.

Definition.

It is said to be due to two causes, acting simultaneously. These are — 1, bronchocele ; 2, consanguineous marriages. The offspring of such marriages (parents with goitre) are mostly cretins. They are idiots of a low grade, may be deaf, or dumb, or blind ; their stature is always diminutive ; head large, flattened at the top, and spread out laterally ; countenance vacant, nose flat, lips thick, lower jaws elongated, mouth gaping, tongue large and protruding, legs short or curved, and skin coarse and rough ; habits disgusting.

Two causes.

Characters.

Symptoms.

*Treatment.*—These cases require moral control, mental training, nourishing diet, wholesome water, and tonics, and children should be removed from their village home to an airy locality.

Treatment.

### OBESITY.

Obesity signifies fat. The amount of fat constitutes a disease. It is a condition in which there is over-accumulation of fat under the skin and around some of the viscera, but without any fatty degeneration of tissues.

Obesity.

Definition.

*Corpulency* also signifies accumulation of fat in the proportion of one to twenty parts of the weight of man, but is not a disease. Fat is a bad conductor of animal heat, and thus serves to compensate for the waste of tissues during illness.

Corpulence.

Definition.



Varieties of  
obesity.  
Partial and  
complete.  
Seat.

Obesity may be complete, as in the case where fat is accumulated under the skin of the abdomen or between the muscles; partial, as around the heart, between the pericardium, in the mesentery (pot belly), in the omentum, round the kidneys, round the mammæ, and about the nates. The propensity to obesity is common at all ages, more so in females than in males, and chiefly after the cessation of menstruation, and especially in those who have not borne children, and in whom menstruation has been scanty and irregular.

Causes.  
Hereditary  
or constitu-  
tional.

*Causes.*—It is said to be either hereditary or constitutional, and may be found both in separate individuals as well as in nations. Overfeeding, too free use of some fluids, as beer, and of fatty, farinaceous, vegetable and saccharine food, long-continued ease of body and mind, too long sleep, and absence of sexual appetite, all predispose to it. Fat is formed in the body from food containing it, or from chemical changes of starch and sugar. Obesity does not conduce to health or longevity. There is diminution of bodily and mental activity, with panting on least exertion. It is accompanied with diminished vital powers, and respiration, circulation, and digestion are disturbed. The blood is deficient both in quantity and quality, the muscles gradually become weak and less firm, the countenance appears bloated and sallow, and the patient is more inclined to repose and idleness, and though apparently lively and cheerful, is generally very stupid in his actions. There is liability to gout and to neuralgias. Sudden death is common.

It has its  
effects for  
evil.

Treatment.

*Treatment.*—Attention must be paid to the quality and quantity of food. The diet should consist of meat, fish, fresh vegetables, bread, and tea; avoid butter, milk, soups, sugar, and beer. Abundant exercise and not more than seven hours' sleep are to be enjoined. Give purgatives, emetics, and drugs, as bromide of ammonium or bromide

of potassium, guaiacum, *Liquor Potassæ*. Formerly the practice was to bleed from the arm, to give only vegetables with vinegar, Turkish baths every day, and to prescribe occasional starvation. Grief brought on or induced is an old remedy.

### FEVERS.

Fevers are included under the head of General Diseases. Fevers.  
 Fevers run a definite course, and in definite though History.  
 in different periods. As a rare exception they occur more than once during life. They are contagious, are propagated by some atmospheric influences, are epidemic when spread over a large area, or endemic when peculiar to a certain fixed locality, and can to a great degree be prevented by attention to hygiene. Their phenomena are best explained as due to some infectious poison introduced from without.

Fever is simply an unnatural heat; the temperature of the body ought to be  $98.4^{\circ}$ , and when it rises above this fever exists. Such rise in temperature may be due to a very slight internal cause, or may be produced by an external injury. Every suppuration is associated with some rise of temperature; but in works on medicine, as well as in every-day language, the term fever is applied in a special sense to those diseases in which the rise of temperature is a main and not a subsidiary incident, and in which it seems directly due to the introduction of a poison into the system. It is impossible to separate, by any definition, such fevers from other zymotic diseases, from diphtheria, mumps, whooping-cough, influenza, in which an unseen poison is introduced, and from glanders, farcy, hydrophobia, and snake-bite, in which an obvious poison is directly inserted into a blood-vessel. But for the purposes of practical convenience, it is better to consider these latter diseases under

the head of the organs or tissues which they mainly affect. The remaining zymotic diseases or true fevers are easily separated into two groups, the exanthemata and those without a rash. The exanthemata are chicken pox, scarlet fever, smallpox, cow-pox, measles, typhus fever, typhoid fever, and dengue.

Stages. Incubation.	In certain points all fevers are alike; they are all, as is said above, supposed to be due to a poison somehow introduced into the system. A period succeeds in which the poison may be supposed to be developing; this is called the stage of <i>incubation</i> . It is supposed to have a given length for each fever, but, except in the case of smallpox, its duration is a matter of hypothesis, though no doubt it can be approximately determined in many cases. Its
Symptoms.	<i>symptoms</i> are much the same in all fevers, and are an indefinite languor, a sense of not being quite well without knowing how, defective spirits, loss of appetite, irregular action of bowels, and abnormal secretions. The stage of incubation is succeeded by what is called the first day of
Invasion.	fever, and this begins the stage of <i>invasion</i> —the actual disease. In every case this first day, from which and not from the date of infection every fever's duration is computed,
Symptoms.	is always marked by the occurrence of a single rigor or of several rigors. A <i>rigor</i> is defined to be that condition of
Rigor.	the body in which there is a general sense of cold, while the thermometer shows an increase of the temperature of the body, <i>e.g.</i> a man who falls into freezing water shivers, has goose-flesh, has increased activity of the kidneys, all which symptoms occur in a man who has a fever, but with this difference, that the temperature in the mouth of a man who has fallen under water is $98.4^{\circ}$ , while that of the febrile patient is at $99^{\circ}$ or $100^{\circ}$ , or some higher degree.

Eruption.	In one group of fevers a <i>rash</i> appears on a definite day, usually on a definite part of the body, and of a definite appearance; it spreads and may disappear, but in some
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fevers returns. The disease goes on for a time, not always quite definite in length, but of about the same length in each kind of fever, and then the stage of *decline* or *defervescence* begins. In some fevers this stage is complete in a few hours ; when this is the case a *crisis* is said to occur. In others the commencement and duration of defervescence are less clearly marked and the fever seems to pass off gradually, convalescence succeeds, and, as in other diseases, there are peculiar *sequelæ*. In the fevers without rash, there is a tendency to periodicity. In other points they do not differ from the exanthemata.

Deferves-  
cence.

The term *continued fever* is applied to those in which, as in chicken-pox, scarlet fever, small-pox, cow-pox, typhus, and typhoid fever, the fever proceeds in one course from end to end, as distinguished from the malarious fevers, in which there are distinct intermissions and recommencements. The *primary fever* is that which is begun by the rigor, as in a surgical case it is by the injury ; and *secondary fever* is that which succeeds when suppuration begins, whether medically, as in smallpox, or surgically, as in a wound.

Continued  
fevers.

Primary  
fever.  
Secondary  
fever.

The simplest of all continued fevers is that feverish attack which in some degree accompanies every catarrh of a mucous membrane ; at other times is present and with no other symptoms than those due to slight rise of temperature. This is called *febricula*, and may be dismissed with the remark that such symptoms are produced by very slight causes in children, but may nevertheless be indications of some grave disorder, and cannot, therefore, be watched too closely, and in them this fever, though so slight, may be associated with delirium. All the other continued fevers are associated with distinct eruptions.

Febricula.

*The phenomena of fever include—The heat of skin.* In this there is increase of temperature above the normal degree. The temperature is taken by the thermometer, which

Phenomena  
of fever.  
Heat of skin



is essential to the satisfactory determination of the existence of any rise in the temperature of the body, as sensation is often deceptive. In fever the temperature may rise from  $98.4^{\circ}$  to  $110^{\circ}$  or  $112^{\circ}$ . In some diseases, as in cholera, it continues to rise after death.

Thermometer.

By the thermometer we determine the presence, intensity, and character of fever in the body. By the habitual use of it in every case we may often discover a disease of which no obvious signs had been before detected, but which may be confirmed by further and more careful physical and other examinations. If, during apparent health, the temperature suddenly rises from  $98.4^{\circ}$  to  $104^{\circ}$  or  $105^{\circ}$ , and then falls rapidly in a few hours and becomes normal, we may conclude the case to be one of malarious fever. The thermometer should be a self-registering instrument, and before using it the registering index should be brought down to  $98^{\circ}$ . The bulb of the instrument should next be kept in close contact in the axilla for five minutes, or placed under the tongue, or introduced into the rectum or vagina, and observations taken twice during the day, from 7 to 10 a.m. and from 3 to 7 p.m.

High temperature and low temperature both indicate disease; very high temperature indicates grave danger, and no one has been known to live after reaching  $112^{\circ}$ . It is approximately true that each fever has a definite thermometric course, and it is a good plan to keep a graduated sheet of paper at the bed-head, so that the curve formed by the several points of daily temperature may be accurately traced.

Alterations in the secretions.

*Alterations in the secretions.*—In fever there is always an excessive waste or destruction of tissues. The secretions and excretions of the body are altered in quality and also diminished in quantity. The skin is rough and dry. There is diminution of the saliva and the intestinal and gastric secretions. The tongue is furred, the mouth pasty

or parched, and there are great thirst, absence of appetite, and constipated bowels. Nausea and vomiting are also common. The urine is scanty, high coloured, of a strong odour, of high specific gravity, and containing an excess of urea and uric acid. Its chlorides are deficient or may even be absent. Albumen is often present when the temperature is high for several days.

*Disturbance of the circulatory and respiratory system.*

Disturbance  
of the  
circulation  
and the  
respiration.

—*The circulatory system*: the pulse generally rises with the temperature; often rises to 120 or even 140 or more. During health the proportion in the rise of temperature and pulse is 1° of temperature to an increase of 8 beats in the pulse. In fevers the blood is itself altered; its alkalies, albumen, and red corpuscles are diminished, and the white corpuscles increased; the fibrin is increased in some cases and diminished in others. *Respiratory system*: in health the respirations are about 18 in a minute; are increased to 40 or 50 in a minute in fevers.

Respiration

*Nervous system*.—In fever it is disordered. During the onset the patient complains of languor, muscular debility, and chills, a general soreness, and disinclination to work, with occasionally headache, restlessness, and slight nocturnal delirium. In some fevers there may be extreme prostration from the first; generally it comes on during the progress of the disorder, and is accompanied with violent or low muttering delirium, stupor or coma, or with muscular twitchings, subsultus tendinum, or convulsions.

Nervous  
system.

*Tissues*.—There is an undue waste of tissues; so that owing to this and to the consumption of very little food, the patient rapidly loses flesh and becomes depressed. Notwithstanding the scantiness in the quantity of secretions and excretions of the body, it has been shown that the amount of solids excreted by the kidneys during fever is actually increased, and the heavy offensive odour of breath in fever shows that it contains a large amount of

Waste  
tissues.

decomposing organic matter, and the blood also contains much of excrementitious matters. In local inflammation, as pneumonia, occurring during fever, the excess of excreted solids disappears till the inflammation has passed.

Pathology.

*Pathology.*—The fever is probably due to some morbid poison introduced from without or generated within the system. The poison may be formed at a local inflammatory lesion, or may be the result of some pyrogenic fluid existing in the blood. It is said that fluid containing bacteria is the pyrogenic fluid, and if injected into the blood it has been shown to excite fever. This fluid or poison disturbs the nervous system by irritating directly or indirectly the sensory nerves; this abnormal condition of ganglionic nerve-centres leads to excessive waste of tissues caused by continued raised temperature.

Destructive changes in the blood and tissues.

*Destructive changes in the blood and tissues.*—In the tissues: it has been physiologically ascertained that during health the destructive waste of tissues does not take place, for the food we take yields materials enough to sustain animal heat without waste. During fever the waste of tissues goes on rapidly. There is also tendency in fevers for tissues to be converted into substances of a low organization; thus, the muscular tissue, fat, nerves, and bones, and even the red corpuscles of blood, undergo a form of degeneration. The glands become congested and enlarged, their cells large and granular, and to this is due the enlargement of the lymphatic glands, the liver, and the spleen often observed.

Post-mortem appearances.

*Post-mortem appearances.*—The post-mortem appearances in fevers are tolerably uniform, and are the results of the high temperature. The arteries and valves of the heart are usually blood-stained, the heart itself is softer than in other cases, and is often slightly dilated. The liver is somewhat enlarged and soft; both it and the lungs are usually gorged with blood. The spleen is enlarged in

a degree which varies with the intensity of the fever. The kidneys are somewhat enlarged, and their cortical substance presents a clouded appearance on section.

*Prognosis.*—It varies with the intensity and the character of fever and with the health of the patient. *Intensity*: the higher the temperature, as  $107^{\circ}$  or  $110^{\circ}$ , the greater is the danger. *Type*: all low fevers have a tendency to become adynamic, and must be looked upon with anxiety. *Previous health* of the patient: in the young and plethoric, fever is more severe and high than in the old and anæmic; the danger is greater if the patient has previously suffered from any specific diseases, as gout, organic disease of the kidneys, or of the heart. Prognosis.

*Treatment.*—Certain specific and eruptive fevers must be allowed to run a definite course. This must be borne in mind throughout the treatment. Treatment.

*Indications.*—To diminish the pyrexial state by external applications of cold, by the use of remedies which increase the secretion from the skin and make an impression on the nervous system. Cold may be applied by sponging the body with cold or tepid water; cold douching while the patient is put in a warm bath; wet sheet packing; ice bags; injection of ice water into the rectum; and warm or tepid bath. The temperature may thus be gradually reduced. The application must be repeated several times in twenty-four hours. Cold has the effect of reducing the pulse, diminishing the temperature, relieving the low nervous symptoms, checking the destruction of tissues, and in specific fevers either of encouraging the eruptions to come out freely when defective, or of limiting its amount and improving its quality when in excess and poor. Indications.

*Drugs.*—To reduce fever medicines such as aconite, digitalis, arnica, veratria, and antimony, have been given with effect. Quinine is used to keep down the Drugs.



temperature when once the remission has set in ; sulphurous acid, salicin, its salts, and salicylic acid, also act beneficially.

Bowels should be freely moved and the action of the skin and kidneys promoted. These eliminants act by removing the poison from the blood and the products of destructive waste of tissues. Diaphoretics, diuretics, free use of diluents, hot linseed, poultices to the pubes, dry cupping, and mustard to the loins, may be effectively prescribed.

Diet.

*Diet* should be liquid and easily digestible, given in small quantities at short intervals. *Stimulants* must be used with caution. If the powers of the system fail give them repeatedly, but in small doses and sufficiently diluted. In certain conditions very large doses can be tolerated without producing any intoxicating effects. Stimulants act by maintaining the action of the heart, and inability to hear more than one sound of the heart is a valuable indication for their use. Thus, in fevers, if the impulse and sounds of the heart are weak, and the pulse also low in tone and frequency, alcohol improves them. Under its use the tongue becomes moist, the skin perspiring, the temperature reduced, the respirations lessened in frequency, and the nervous system cooled down. If under the use of stimulants the tongue becomes dry, skin more hot, and respirations hurried, the alcohol does harm, and therefore should be discontinued. In such cases plenty of milk with diaphoretics will succeed well. In low typhoid symptoms stimulants are most useful. Even then they should be administered with caution. If the breath smells of alcohol and the urine becomes scanty and albuminous, stop the stimulant at once. Ventilation, cleanliness, rest of the body and mind, are most important requisites in fever. The presence of many relations and friends near the patient, except that of a competent nurse, should be avoided.

Stimulants.

*Urgent symptoms.*—*Thirst* may be relieved by cooling drinks, made of barley-water, tamarind-water, toast-water, honey and water combined, and ice. *Vomiting* is often due to some irritating stuff in the stomach, and an emetic therefore does good. Cooling drinks, and sinapisms to the abdomen, are other remedies. In rare cases, where all attempts to check it fail, strychnia in minute doses is useful. Small and often repeated doses of ipecacuanha wine have a wonderful effect. *Bowels*: when constipated, purgatives; when loose, astringents are required. *Head symptoms*: headache, if severe and constant, direct application of ice, of eau de Cologne, of rose water, or application of powdered ginger mixed with boiling water, will do well. Often tight compresses to the temples succeed in relieving it. If with the headache the eyes are congested a few leeches to each temple will do good. Very often cold or warm affusions to the head prove serviceable. In some cases the head may be shaved, and cold constantly applied. Dry cupping over the nape of the neck, and even small blisters to the temples or to the neck, are useful. *Sleeplessness*: sleep may be procured by giving opium in any of its forms, or bromide of potassium, hyoscyamus, or hydrate of chloral. In throbbing of the temples with violent headache and active *delirium* small doses of antimony or of ipecacuanha with opium may be given, but if the delirium be low stimulants with opium succeed well. Opium is contra-indicated if the lungs are involved, if the kidneys are affected, if there be stupor, or if the pupils are contracted. In such cases various other remedies, as bromide of potassium, bromide of ammonium, nepenthe, hyoscyamus, belladonna, and even chloroform, may be substituted for opium. In *stupor* or coma use externally free douching to the head, blisters to the scalp or to the nape of the neck, sinapisms and turpentine stupes to the chest and

Urgent  
symptoms.  
Thirst.

Vomiting.

Bowels.

Headache.

Sleepless-  
ness.

Delirium.

Stupor.

legs. Internally also give coffee and stimulants. *Adynamic symptoms* : stimulants and nourishing diet are urgently demanded in such cases. These are ammonia, bark, quinine, ether, chloroform, musk, camphor. *Complications* must be treated as they arise. During convalescence give slight nourishing diet, attend to all hygienic laws, give tonics, and recommend a change of air to a bracing climate.

### CHICKEN-POX. VARICELLA.

Chicken-pox.  
Definition.

Chicken-pox is a contagious eruptive disease characterised by numerous vesicles upon red elevations, which desiccate in about five or eight days after eruption. The initial symptoms last for a day or two, and are followed immediately by eruption. Its duration is from six to seven days. It sometimes prevails as an epidemic, is contagious, and attacks but once in life the same person. The attack is characterised by the mildness of the premonitory symptoms, the vesicular character of the spots, the absence of any hard shot-like feel to the fingers, and the shorter course of the complaint.

Symptoms.  
Incubation.

*Symptoms.*—*Incubation* : is of short duration, lasting at most two days. Its symptoms are slight vomiting, irritable temper, loss of appetite and great thirst.

Invasion.

*Invasion* sets in with fever, headache and pains in the back, and is slight and the symptoms mild.

Eruption.

*Eruption.*—Eruption appears as small rose-coloured papules, without any inflamed ring around them in the first stage, and at first in front of the trunk. In a few hours these become vesicular in their centres. They usually begin to appear within twenty-four hours after the invasion, and last also for twenty-four hours. They appear singly or in groups, and in successive crops for four or five days. On the second day of the eruption the pimples become converted

into transparent vesicles, while on the third day their contents become yellow, and are surrounded by a red areola. They first appear on the shoulders and back, and then on the scalp, and on the face. On the fourth or fifth day of the fever desiccation begins, and those vesicles which are not broken or only torn by the child to appease itching, become shrunken at their margins. They fall off between the eighth and ninth day, and seldom leave any pit. There usually is no "secondary fever." Temperature rises to 101°.

*Decline.*—The fever goes down with the eruption in seven days or often less, when convalescence sets in. Decline.

*Prognosis.*—Favorable; trouble, if any, arises from catarrh or pneumonia contracted by imprudent exposure. Prognosis.

*Treatment.*—Attend to diet and avoid cold. If fever and headache be considerable, treat on general principles. Rest in bed and cold or tepid baths are essential. The patient should be separated from those who are liable to get the disease. Treatment.

### SCARLET FEVER.

Scarlet fever is epidemic and highly contagious. It is essentially a disease of childhood, being rare in adults, and occurs only once in life. The rash appears on the second day and ends about the sixth or seventh day. Simultaneous inflammation of the mucous membrane of the mouth and pharynx and tonsils, and is followed by desquamation. Different epidemics vary in intensity. Thus Sydenham, in the reign of Charles II, speaks of scarlet fever as hardly more than the name of a disease. Scarlet fever.  
Definition.

*Characteristic marks.*—There is diffuse scarlet or crimson redness (of different shades) of the skin generally, and of the mucous membranes of the fauces and tonsils. The redness comes on the second day of the fever and Character-  
istic signs.



lasts for five days. It begins most often at the root of the neck, but never on the face, and spreads over the whole body within twenty-four hours, and is soon followed by copious desquamation. Besides redness of the skin there is inflammation of the submaxillary glands, with enlarged tonsils, sore throat, great heat and dryness of the skin, and rapid pulse. At first the tongue is coated white in the middle and red at the tip and edges, becoming afterwards clean and raw looking. It is also covered with red elevated papillæ.

Varieties.  
Simple.  
Anginose.  
Malignant.

*Varieties.*—Simple, anginose and malignant. In them the effect of the poison is to congest the blood-vessels of the mucous membrane lining the stomach and intestines; this is soon followed by a rapid proliferation and desquamation of their epithelium, just as it takes place on the skin; the cells from the tubules of the kidneys are also cast off in the same manner.

Simple.

The *Simple* is characterised by slight inflammation (angina simplex), but no ulceration of the fauces, by moderate fever, and by regular eruptions, and is supposed to originate in blood and other cast-out matters lying about slaughter-houses.

Pathology.

*Pathology.*—The poison is contained in the secretions of the skin and fauces; is carried by the air a few feet, and also by fomites. Is of a material nature and carried by the skin or through the lungs or the stomach. It is inoculable and prevails in all seasons. In India it is most frequent in the months of May, June, and July.

Symptoms.

*Symptoms.*—*Incubation* varies from twenty-four hours to two weeks.

Invasion.

*Invasion.*—In children it may be sudden, and is often preceded by delirium, or by nausea, vomiting, chilliness, drowsiness, great thirst, loss of appetite, constipation of bowels, and sore throat; there are also frontal headache, frequent pulse, temperature about  $104^{\circ}$  or  $105^{\circ}$  on the first day, difficult deglutition, scanty, high coloured

urine. The patient is restless and often has slight delirium.

*Eruption.*—On the second day of the fever bright red points are noticed, first on the neck, then on the breast, arms, abdomen, and lastly, on the lower extremities; the redness is diffused on the limbs and on the fingers, and upon the trunk; it is distributed in irregular, vivid red blotches, disappearing under pressure, not much elevated, and without any determinate form; the redness is most marked about the flexures of the joints, but it is to be remarked that there are no absolutely clear spaces. There is a feeling of burning, irritation, or itching in the skin. If a nail is drawn over the skin where eruptions exist, a central red line, with white streaks on either side, is produced. The redness reaches its maximum about the third or fourth day, and then the eruption declines with desquamation of the skin. The *desquamation* lasts for eight or nine days, and is in the form of scurf on the trunk, and of detached cuticle on the hands and feet; often this kind of peeling off of the skin of the hands lasts for about three or four weeks. The fever does not abate with the appearance of the eruptions; on the contrary, it exacerbates towards evening, and there is also delirium. Pulse is 120, 140, or 160 in a minute; the skin is pungent, hot, and dry, the respiration is more rapid; the tongue is coated with a thick fur at first, but in two or three days becomes of a deep red colour and shining, like raw flesh, its papillæ enlarged and projecting. The temperature rises when the eruption is fully developed; it often rises to 108° to 110° and then subsides slowly. It rises rapidly till the day of the eruption; after the eruption it gradually falls, and in five or six days it is again normal. It is highest on the third day of the fever, or on the second day of the eruption. There may be vomiting; abdomen is somewhat tender; liver and spleen enlarged. The urine is scanty, of high

Eruption.  
Characters.

Desquama-  
tion.

ever.

Pulse.

Temperature.

specific gravity ; urea is not necessarily increased ; chlorides diminished ; uric acid normal for first three days, then diminishes to half or one third. With the skin the mucous membrane also becomes affected with the eruption. The tonsils are enlarged, congested, and swollen, and tender when touched behind the angle of the jaw ; the uvula is also cedematous. The submaxillary glands and the lymphatics are tumid. The patient grows weak and tremulous.

Decline.

*Decline.*—This stage commences about the sixth, ninth, or tenth day of the fever, and lasts for about a week or ten days. In favorable cases the symptoms decline with the eruption, the pulse loses its frequency, the skin is less hot, there is less swelling of the tonsils and pharynx, deglutition is more easy, and the appetite improves. Desquamation takes place first on the palms of the hands. During desquamation the urine is abundant, of acid reaction, of low specific gravity, contains albumen, and is deficient in uric acid. It also contains hyaline and epithelial casts and blood-corpuscles. If the case goes on badly, typhoid symptoms set in and the throat becomes ulcerated and sloughs, and there is tendency to dropsy, which ought to be looked for, and often uræmia supervenes.

Favorable cases.

Unfavorable cases.

Anginosa.  
Symptoms.

*Anginose form.*—In this variety the symptoms are more violent. The throat is sore and ulcerated, and pseudo-membranous exudation forms on it.

Incubation.

*Incubation.*—Is of very short duration.

Invasion.

*Invasion.*—Sets in with violent fever and headache, delirium, restlessness, and extreme prostration, the skin is pungently hot, and there is severe nausea, vomiting, and often diarrhœa. On the next day the pain in the throat, stiffness of the neck, hoarseness of voice, and painful deglutition are noticed. The fauces, uvula, palate, parotid and submaxillary glands, appear red, swollen, and covered by patches of exudation. The tonsils are also swollen. The

fever is very high, the temperature  $105^{\circ}$  or  $107^{\circ}$ , and there is sometimes delirium. In most cases stupor alternates with convulsions, and death takes place in a few hours.

*Eruption.*—The eruptions are irregular, both as to extent and date. They appear first in scattered patches on the chest and arms, and then spread and vanish in two or three days. Eruption.

*Decline.*—Fever and inflammation of the throat abate, though painful deglutition lasts for a week or ten days. Inflammation of the serous and mucous membranes is very common. Decline.

*Malignant form.*—Is rapidly fatal in less than twenty-four hours. It is, like the anginose form, attended with, pseudo-membranous exudation. Malignant.

*Symptoms.*—There is no incubation period. Symptoms.

*Invasion.*—Sets in with extreme prostration and depression; there is from the first delirium and stupor, with vomiting, and cold extremities. The pulse is feeble, rapid, and irregular, the tongue is brown, the throat is apt to slough, and the glands of the neck are greatly swollen. The fever rapidly assumes a typhoid character, and cerebral symptoms are superadded. There is great irritability and restlessness, and low muttering delirium; the pulse is extremely feeble and irregular, and barely perceptible, the respirations are oppressed; there is generally diarrhœa; the tongue is dry and brown and chapped, the breath is fœtid, and there is sordes about the teeth; the throat is swollen and covered with fœtid sloughs. The urine contains albumen from the first. Incubation.  
Invasion.

*Eruption* often comes very late, but disappears in a few hours, being of a dull hue, changing into a livid red. The disease terminates fatally on the third or fourth day. In some cases there may be suppression of urine and death from uræmic convulsions results. Death from fibrinous coagula in the heart, or from hæmorrhage as the sloughs detach, is common. Eruption.



Complica-  
tions.  
Acute  
Bright's  
disease.

*Complications of scarlet fever.*—The most important complication of scarlet fever is *desquamative nephritis*, indicated by albumen in the urine. It occurs in a large proportion of cases, and is associated with dropsy. It is preceded by constipation, and sometimes begins without any warning. Sometimes it is announced by a slight rigor. When it has begun it does not differ in its symptoms, its prognosis, or its pathological results, from the acute nephritis which occurs without preceding scarlet fever, and which is described under Diseases of the Kidney.

Rheumatism.

*Rheumatic* symptoms occur towards the end of many cases of scarlet fever, with all the usual complications of rheumatism, pericarditis being in these examples perhaps the most frequent. *Pneumonia* and *pleurisy* may also occur without any rheumatic symptoms.

Pericarditis.

Pneumonia.  
Pleurisy.

Sequelæ.

Chronic  
albuminuria.

*Sequelæ.*—Chronic albuminuria is a frequent sequel of scarlet fever. It may be of that form in which a large pale kidney is found on post-mortem examination, or of that in which a small red kidney is found, or a small pale kidney. It does not differ in any way from those diseases described in the chapter on the Kidney, but it is worth remarking that this disease, originating in scarlet fever, is a common cause of convulsions and death in the first confinement of young women.

Otitis  
interna.

Abscess of the internal ear (otitis interna) is another common sequel. Its consequences are grave; permanent deafness results from it, or the abscess in the ear may infect other parts of the body, and a patient may die of meningitis or of pyæmic nodules in the lungs. As the abscess may show no external symptoms, the causes of death in these cases is often very obscure till cleared up by post-mortem examination. An attack of scarlet fever may give rise to the first appearance of the symptoms of scrofula. In cases where the disease is merged into diphtheria paralytic symptoms have been known to

Scrofula.

Diphtheria.

occur. It may be remarked that during epidemics of scarlet fever persons who have had the disease and are in the neighbourhood of the sick often suffer from sore throat.

Sore throat.

*Treatment for scarlatina simplex.*—Keep the patient separate in order to prevent spread of the disease, and properly clothed, in a well-ventilated room, and in perfect repose. Nutritious liquid but not stimulating diet and cold drinks are beneficial. The danger of infection during desquamation should be guarded against by rubbing the patient night and morning with carbolised oil; and undue exposure to cold avoided so as to prevent sequelæ.

Treatment.  
Scarlatina  
simplex.

*For anginosa.*—Cold sponging two or three times every day when there is great heat of skin. If the tongue be coated and there be great irritability of the stomach use small doses of ipecacuanha, and treat it as a case of simple continued fever. The diet for the first five or six days should be liquid. For pain in the throat and for exudations over the tonsils use vapour of hot steam or hot milk, and local applications and anodyne gargles with chlorate of potash. Tinct. Ferri Perchloridi may be freely used in these cases.

Anginosa.

*For maligna.*—The stimulant plan of treatment ought to be tried, and if there be tendency to coma, cold affusions, cold baths, and cold sheet packings may be recommended. Delirium, diarrhœa, or vomiting, or complications, must be treated as they arise. For dropsy give drastic purgatives, and diuretics if the urine be scanty, with cupping or hot bags of sand to the loins. Wear flannel next the skin.

Maligna.

## DENGUE FEVER.

Dengue fever, otherwise called rheumatic scarlet fever or kidinga papo, is a peculiar form of exanthematous disease, and is epidemic and infectious, and one attack is protective

Dengue  
fever.  
Definition.  
History.

as a rule. It is popularly known as dandy fever or break-bone fever. Some years ago it attacked the natives of India, and it was then called leg fever, from one of its most prominent symptoms, viz. severe pain in the lower extremities. The nomenclature, *kidinga papo*, was derived from Arabs, with whom the word *papo* meant an evil spirit, and *kidinga* a cramp. Thus, *kidinga papo* meant cramp-like pains caused by evil spirits. As an epidemic it has been very limited in its range. As yet it is not known in Europe. Even in India it is only limited to certain localities, as Bengal, Bombay, Cutch, and Calcutta. In Bombay it broke out with great severity in 1875.

Symptoms.

The disease varies in its symptoms according to the locality. Its seizure in a majority of cases is sudden. The patient complains of pain and stiffness of muscles of the palms of the hands and the soles of the feet. The pain is increased on movement. In some cases there is stiffness of the body. This is soon followed by fever. The skin is hot and dry, the tongue is clean, but red. The face is of a bright scarlet colour, and is also somewhat œdematous. There is also pain in the shoulders and in the ankle-joints and wrists. On the second day of the attack the pain is followed by swellings of the small joints, which are also painful on pressure. There is obstinate constipation. In some cases the disease only lasts for forty-eight hours and then subsides. In a vast majority of cases there are remissions, and the febrile phenomena return, and with the fever the eruption. The eruption resembles erysipelas, only the discoloration is less intense than in that disease. It spreads over the whole body in from thirty-six to forty-eight hours. It first appears on the head and then spreads downwards. In severe cases the neighbouring lymphatics swell, *e.g.* in the neck, axillæ, and groins. The mucous membrane of the mouth and throat also become red and tender, and aphthæ appear,

with great tumefaction of the nose and lips. The acute stage generally terminates by the end of the first week, when the skin begins to desquamate.

*Complications.*—Malarious fever, occasionally sunstroke, and disease of the spleen. Complications.

*Sequelæ.*—The disease often leaves stiffness of joints for many months. Painful gums and scurvy also follow it. Sequelæ.

*Treatment.*—The patient should remain in bed and have nutritious diet. No stimulants should be given. Anodynes may be prescribed, both locally and internally, as a relief to pain. The treatment for febrile phenomena is the same as in cases of malarious fever. During remission give iodide of potassium in large doses, and to be continued a few days after desquamation. Treatment.

#### SMALLPOX OR VARIOLA.

Smallpox is a contagious eruptive fever, characterised by an initial fever which lasts for three or four days, and followed by a cutaneous eruption, at first papular, then vesicular, and lastly pustular. The eruption attains maturity in from six to nine days, after which the pustules are converted by desiccation into scabs, which fall off between fifteen and twenty-five days. These often leave a pit or scar. The disease prevails to some extent among the poor and destitute who neglect vaccination, and also among the rich natives of India, who, from prejudice or ignorance, refuse vaccination for their children. The disease is now-a-days usually modified by previous inoculation or vaccination. Modified smallpox is always a milder disease, and this circumstance, with its shorter duration, illustrates the salutary effects of vaccination. Smallpox.  
History.

*Pathology.*—Smallpox is produced by contagion or infection; the poison can only be received through the lungs or the skin; is apt to become inert if exposed to air. Is most prevalent in the spring. Pathology of  
smallpox.



- Stages.** *Stages.*—These are four in number. 1. Incubation. 2. Primary fever. 3. Eruption; and 4. Decline.
- Incubation.** *Incubation.*—It continues from seven to eight days without any indisposition.
- Initial fever.** *Primary fever or initial stage.*—It commences in children with convulsions, and in adults with pain in the loins and bones, with rigors, followed by fever and profuse sweats, with headache, nausea, persistent vomiting, loss of appetite, and constipated bowels, the tongue is red at the tip and edges, and there is restlessness, sleeplessness, and delirium. The fever is generally very high, the temperature is  $104^{\circ}$  or  $105^{\circ}$ , the pulse 120 or 140 in a minute. All these symptoms are relieved in the course of the third day, when the eruption begins to appear.
- Eruption.** *Eruption.*—On the third day after invasion, or on the third day of fever, eruption appears as small, isolated red specks, which are converted into papules, hard like shots. They show first on the face, neck, and wrists. In severe forms the eruption appears earlier than in mild cases. As a rule a roseolar rash precedes the true eruption. On the second or third day after the eruption the papules become vesicles and are depressed in the centre (umbilicated); subsequently the vesicles form pustules. This change takes place from the fourth to the sixth day of the eruption. When the pustules are scattered over the surface they are called *discrete*, but when numerous and run together, they are called *confluent*. The *confluent* form is very severe, as a large portion of the skin becomes inflamed. During the changes which the vesicles undergo they become surrounded by inflamed areolæ and which run together, so that spaces between pocks are of bright red colour. In the *discrete* variety the areolæ fade gradually into the natural colour of the skin, at a distance of two thirds of a line from the base of the vesicles. The pustules or maturation pocks are not umbilicated as the vesicles, but
- Confluent.**
- Discrete.**

are convex on the surface. Like vesicles, they appear first on the face, then on the trunk and extremities. During maturation the areolæ gradually fade and assume a purple hue. Not only do the eruptions appear on the skin, but also on the mucous membranes of the mouth, nose, pharynx, œsophagus, and sometimes prepuce or vulva, and even conjunctivæ or margins of lips. It is attended with derangement of the nervous system. Pregnant women abort while suffering from it. When pustules appear in the mouth and throat inflammation takes place, and the tongue and gums present white points with red membrane between. The pustules often exist in the pharynx, as may be known by the sore throat, the difficulty in swallowing, and the tenderness of the submaxillary glands. If the pustules attack the larynx, the voice becomes hoarse or whispering. There is also swelling of the subcutaneous cellular tissue, causing the skin to be swollen, red, elastic, and shining; this swelling is greatest on the face. It goes down as desiccation proceeds.

Pustules.

The *initial fever* sometimes continues for a day or two after the eruption, and when papules are formed the fever disappears entirely; throughout the whole vesicular period there is no fever, *i. e.* till the sixth day. The appetite returns and sleep becomes tranquil, the pulse and temperature normal.

Initial fever.

About the sixth day of the eruption, the pustules have ripened on the face and commence to mature on the extremities, the suppurative stage begins and all the vesicles are converted into pustules. Towards the termination of this stage a disagreeable foetid odour is exhaled. This stage is attended with secondary fever.

The *secondary fever* generally sets in about the sixth day of the eruption. The pulse rises from 85 to 120, becomes full, hard, and strong; the skin is hot and dry. The temperature rises to 100° or 106°. After the

Secondary fever.

suppuration has been fully established, *i.e.* on the ninth or the eleventh day of the eruption, or after suppuration has lasted for four or five days, the secondary fever disappears. About this time the *desiccation* is nearly completed on the face and has just commenced on the limbs.

Desiccation.  
Stages of decline.

*The stage of decline.*—During this stage the pustules break and discharge their contents, and then dry and desiccate or desquamate; this is also called the desiccation stage. The crusts or scales begin to form between the sixth and the ninth day of pustules, and terminate between the tenth and eleventh day. The temperature during the decline falls from  $106^{\circ}$  to  $99^{\circ}$  or  $98.4^{\circ}$ . The pulse is reduced to 90. Subsequently these scabs fall off in from four to five days, leaving dry ulcers in their place beneath, and which form pits or depressions. Crusts first begin on the face, and two or four days after the face they extend to the limbs.

Mode of drying.

*Mode of drying.*—In some cases a dark point is formed in the centre, which extends and converts the whole pustule into a hard crust; in others the whole dries at one and the same time; in others again, the epidermis gives way, and the contained fluid which escapes hardens into yellowish irregular crust, which then becomes brown before the crust falls off; some pustules, again, as on the arms and legs, do not form scales, but shrink away, their fluids becoming absorbed, and they leave behind follicles of cuticle, which fall off by desquamation. Some of them ultimately leave depressions or pits which are permanent. In some cases mere blotches of reddish-brown colour are left behind, and which remain for months, and even the whole skin assumes its natural tint.

Anatomy of pock.

*Anatomy of a pock.*—When a vesicle is opened soon after its formation it contains a little serum, which is limpid and alkaline, the skin beneath is red, soft, and moist; its umbilicated appearance is due to adhesion between

the centre of the pock and the surface of the skin beneath. This adhesion is broken at a later period when the pustule becomes globose. A vesicle is made up of various small partitions, and has a fan-like axis, so that when a single puncture is made in it, it does not discharge the entire contents. Soon after the conversion of a vesicle into a pustule a cavity is found which contains a false membrane, which is opaque, white, friable, and is seated on the derm in small white points. These points enlarge, meet, and form the false membranous disc, and which fills the pock with serum and pus. At a later period this disc adheres to the inner surface of the cuticle, and still later it becomes detached or remains loose in the cavity.

*Varieties of smallpox.*—Discrete, confluent, and hæmorrhagic. *Discrete* where the pustules are few, distinct, and separate from each other. *Confluent* where pustules are numerous, circular, and circumscribed, running together, coalescing, and have lost their regularity. *Hæmorrhagic* where they appear in petechial points, and reddish blotches are associated with the pustules and where the contents of the pustules are bloody.

*Discrete.*—In this affection the eruption is papular, ripens into vesicles, and then into pustules. The vesicles enlarge laterally, remain flat, and become depressed in the centre (umbilicated). A vesicle consists of a group of small vesicles (loculi) containing transparent lymph within them. When these vesicles begin to be fully developed a row of red areola forms round each of them. The vesicles gradually change into pustules, and their contents, which were clear and watery, now become turbid and opaque; they also lose their central depression, and become convex or hemispheroidal, and suppuration or maturation is said to result. The pustules after a time burst, and a peculiar characteristic disagreeable odour begins to emanate. In some cases a dark spot appears on the top



of each pustule, which extending converts the whole into a dark crust. In other cases only the cuticle over the spot bursts, a little matter oozes out, which then dries and forms a scab. In the case of the arms and legs the pustules themselves shrink, their fluid becomes absorbed, leaving a pellicle which desquamates. These scabs or crusts leave a purplish-red stain, which fades away in a few days or leave ulcers, which cicatrize and form pits, and thus a permanent disfigurement is left behind. The *secondary fever* is very slight in these cases. From the initial fever very often one cannot predict the type of smallpox, for often in the discrete variety the initial fever and other symptoms may run alarmingly high. On the other hand, in the confluent form, and even in the hæmorrhagic variety, the precursory fever may be only slight.

Secondary  
fever.

Confluent.

*Confluent.*—The earlier the eruption and the more pustules there are on the face the more likely is the disease to become confluent. It is a more severe form than the discrete. During the eruptive stage there is active inflammation of the skin and deeper structures. The skin is also thick and swollen, and hard dark papules or vesicles cover all parts of the body, the vesicles soon become pustules, and the secondary fever is very high. There is high temperature, active delirium, and great disturbance of circulation. The edges of vesicles coalesce, leaving no portion of natural skin to form areolæ, which are therefore absent. The pustules are not well developed; they remain sluggish and flat, contain whitish pus, as best seen on the hands and face. They often run together and form bullæ of several inches in extent. Sometimes the loose cuticle is rubbed off by movements in bed or by scratching, and the denuded surface then discharges serous and sanious fluid. On the fifth day of the eruption the eyelids get tumid, the tonsils and parotids swollen, the limbs also swell, and the patient suffers from diarrhœa or salivation. The urine is

scanty, high coloured, with excess of urea and uric acid, and a trace of albumen, of blood-corpuscles and epithelial cells or casts. There is extreme prostration, great restlessness, great difficulty of swallowing, hoarseness of voice, dyspnœa, and sometimes œdema of the glottis, and death from suffocation.

*Hæmorrhagic* or *malignant* smallpox is rare; and is now seldom seen. Its period of *incubation* is short. The *invagination* is characterised by delirium, a badly developed pulse, prostration, sleeplessness, and hæmorrhages from the mucous surfaces. This form occurs only in very debilitated persons.

Hæmorrhagic variety.

*Eruption*: at first the patient feels as if small shots were embedded in his skin, and generally a red rash, resembling that of measles, appears before the eruption begins. This is soon followed by papules, which pass into vesicles, containing bloody fluid instead of lymph. These do not become pustules, but remain flat, irregular, and flabby. Petechiæ or purpureal stains are often found on the thighs and abdomen. Hæmorrhage beneath the conjunctivæ, and from the bowels, kidneys, or nose, takes place. Death is preceded by coma or by extreme adynamic symptoms.

*Complications* of smallpox generally occur during the maturation stage. These are:—1, Erysipelas; 2, affections of the lymphatics; 3, ulcers through the cornea; 4, supuration of the internal ear; 5, cerebral abscesses; and 6, pyæmia. In the confluent variety albuminuria is as common as in scarlet fever, and if recovery takes place permanent blindness, deafness, or lameness may remain.

Complications.

*Sequelæ*.—Permanent anæmia is a sequel of a majority of cases of smallpox; phthisis often follows in the adult.

Sequelæ.

*Modified smallpox* is a variety exhibited when smallpox attacks individuals who have had efficient vaccination, or those who have had a previous attack of smallpox.

Modified Smallpox

*Symptoms of modified smallpox*.—The symptoms are

Symptoms.

modified in degree, not altered in kind. The fever is severe in the initial stage. The eruption is matured and declines by the sixth or seventh day. The papules are scattered as in the discrete variety, and run through their phases rapidly. Desiccation takes place on the fifth day. There is neither characteristic odour of breath nor secondary fever. The termination is always favorable, and no pock marks remain.

Abortive  
smallpox.

*Abortive smallpox.*—In such cases only the vesicles are formed, and they dry up without producing pustules.

History of  
Smallpox.

Smallpox is highly contagious, and usually attacks but once during life, the recurrent cases being exceptional and rare. When occurring in persons who have never been vaccinated it is often fatal.

Characteris-  
tic symptoms.

*Characteristic symptoms of smallpox.*—The temperature during the invasion of smallpox rises rapidly to  $104^{\circ}$  or  $106^{\circ}$ . During the early period of eruption it falls, but still continues about  $99^{\circ}$  or  $100^{\circ}$ . During maturation it again rises, in mild cases to  $102^{\circ}$ , and in severe cases to  $104^{\circ}$ , or to  $106^{\circ}$  where the case threatens death.

Temperature.

Pulse.

The pulse is frequent during the periods of primary and secondary fever, and the respirations are accelerated.

Vomiting.

*Vomiting* is a characteristic symptom during the period of invasion. There is loss of appetite and great thirst throughout the whole period of the disease. The bowels are usually constipated in adults and loose in children. The urine is scanty, high coloured, and in some cases contains albumen, with casts and blood-corpuscles; but smallpox rarely leads to permanent renal disease or to anasarca. *Perspiration* is usual in the discrete, rare in the confluent variety, and most profuse in children. In the confluent variety the swelling of the hands and feet during the period of maturation is a favorable sign.

Perspiration  
profuse.

During the invasion in children, convulsions, drowsiness, or coma, are common. In adults there is headache

or giddiness with delirium. *Delirium* is common in the confluent variety, and in the worst cases there are also tremulousness of muscles, subsultus, and picking at the bedclothes. Delirium.

*Diagnosis.*—The eruption of smallpox may be confused with that of chicken-pox, or mistaken for a cutaneous disease, or *vice versâ*. When the history of infection is not clear, but febrile symptoms are present, a well-marked vaccination scar will incline the probability towards chicken-pox. Chicken-pox may be distinguished from the majority of cases of smallpox by the comparative mildness of the initial symptoms, but an experienced person will often be obliged to suspend his judgment between varicella and varioloid, and will, of course, take the precautions proper to the latter disease. The absence of raised temperature or of a history of rigors will prevent the confusion of any skin disease with smallpox; but since the patient is always better when the rash of smallpox appears, the mere fact that he has walked to a hospital ought not to lead the physician to conclude that a mere skin disease is before him. In London, patients with syphilitic rashes have frequently been sent to the smallpox hospital, and patients with smallpox into the syphilitic wards of general hospitals. When an epidemic of smallpox is raging, there is danger that all patients who have had a severe rigor with pains in the back should be taken to be cases of commencing smallpox. It should be remembered that these symptoms are common in some other febrile diseases, and especially in quinsy. The fall of temperature after a purge will usually indicate the true character of quinsy where the throat may not have afforded conclusive evidence. Diagnosis.

*Prognosis.*—Persons who have been vaccinated rarely die of smallpox. Of unvaccinated patients aboriginal races show the largest proportion of deaths. The more pustules there are on the face the more dangerous the case Prognosis.



is. Numerous pustules on the body do not seem to indicate danger. The earlier the eruption appears the more serious the case is likely to be.

Treatment.  
Indications.

*Treatment of smallpox.*—The attack cannot be arrested, but if the patient be vaccinated seven days or more before the appearance of the eruption, the disease will be modified. The treatment of smallpox is that of all fevers, except that the patient may be allowed to get up and walk about his room. When the eruption appears, Sydenham recommends roast apples at this stage, and any light solid food may be taken. Stimulants are to be given on the usual indications. The room must be well ventilated. In England the old plan was to wrap the patients up in flannel, and keep the windows and doors shut. Sydenham, about the time Bombay was acquired by the English introduced fresh air as a therapeutic agent in the treatment of smallpox, and in his practice a diminution of mortality was rapidly apparent. The immense success of Dr. Radcliffe, who followed the same improved system in the reigns of William III and Queen Anne, completely established the plan of keeping smallpox patients in well ventilated and not in close rooms. To prevent pitting many plans have been proposed, none of which are effectual. To avoid scratching is the chief point. If the throat be sore from pustules on its mucous membrane an antiseptic gargle may be used.

Inoculation.

*Inoculation.*—The practice of inoculation as a prophylactic against smallpox is now illegal. That it was more or less efficacious in abating the ravages of the disease may be gathered from various passages in the literature of the period in which it was practised. Thus, Mrs. Hardcastle, in Goldsmith's comedy of "She Stoops to Conquer" (1773), says, "I vow since inoculation began there is no such thing to be seen as a plain woman, so one must dress a little particular or one may escape in the crowd."

## COW-POX. VACCINE DISEASE.

Cow-pox.

Cow-pox, otherwise called vaccinia (*vacca*, cow), is an inoculation produced by means of a virus, called vaccine matter, taken directly or indirectly from the cow. It can only be conveyed by inoculation, and not by infection or contagion. Efficient vaccination confers immunity from smallpox except in a few cases, and in these the modified form appears.

Definition.  
Characters.

*Discovery of vaccination.*—Some knowledge of the nature of the vaccine disease and its power to protect the human constitution against smallpox led Dr. Jenner to proclaim its virtues to the world. Dr. Jenner learned that there existed in England a belief that persons contracted vesicular disease from the udder of a cow, and were thereby protected from an attack of smallpox. In order to increase the utility of this protective means Dr. Jenner tried whether it could not be transmitted from person to person. He therefore took the matter from the hands of a milker, and vaccinated a child. The child showed the effects of the disorder in the most satisfactory manner. This was done on the 14th May, 1796. On the 1st July the same child was inoculated with smallpox matter, and he resisted the contagion entirely. The horn of the cow from which Dr. Jenner made his experiment is preserved, with an appropriate inscription upon a gold plate, in the Library of the Royal College of Physicians of London.

Discovery  
vaccination.

1796.

*Period of vaccination.*—The usual time for vaccination is when the child is from four to six weeks old. It may be done earlier if an epidemic of smallpox prevails.

Period of  
vaccination.

*Symptoms.*—After the *lymph* from a vaccine vesicle is introduced beneath the skin of a healthy child, a slight *redness* appears, due to inflammation caused by the puncture. Redness disappears in twenty-four hours

Symptoms.

and a little mark is left. On the third day after the operation the specific effects appear as a little red, hard elevation, surrounded by erythematous redness; over this point the cuticle is raised or elevated, the *vesicle* being only apparent under the microscope. On the fifth day after the puncture a distinct pink-coloured vesicle forms, and is apparent to the naked eye; at first it is circular without elevated edges, and on the sixth day has a depression in the centre. It is surrounded with a narrow ring of inflammation. On the eighth or ninth day it reaches its highest development, and then it changes in colour from pink to the hue of a pearl. The contents of the vesicle are clear lymph, transparent serum, and elementary granules of less definite structure, and look like white blood corpuscles. The vesicle is a collection of loculi or cells, in fact, about eight or ten in number, and from the walls and floor of which lymph is secreted. In some cases there is a dark coloured *scab* in the centre, formed by the drying up of a minute quantity of blood from the puncture or of the dissolved virus which had not been absorbed. On the eighth day the red ring, which was before small, now forms an *areola* round the vesicle. The vesicles change into *pustules*. The areola during the ninth or tenth day forms a scarlet circle perhaps two inches in diameter. The colour is intense at the edge of the vesicle, and fades towards its outermost boundary. The skin on which the vesicle is seated, and also a short distance beyond it, now becomes hard and tumefied. The disease is at its height on the tenth day, after which it begins to subside. The areola disappears entirely on the tenth or eleventh day, and the pustules, which had by this time burst and acquired a brown colour, now begin to dry up and form a scab, and by the fourteenth day form a cavity, in which pus is contained. Desiccation goes on rapidly, and on about the twentieth day the scab falls off, leaving a permanent

circular, depressed, striated cicatrix, in which there are numerous pits. When the disease is at its height, the child complains of heat, itching, and pain in the inflamed part. There is slight fever and pain, and difficulty in moving the limb.

*Performance of vaccination.*—Extreme care must be taken in vaccination, so that no animal matter except the pure lymph is inserted. The carelessness of the operators, and not the process of vaccination, deserves to be blamed when anything but vaccine is introduced. *Susceptibility* varies with the constitution of the individual and with the family. Some never receive it, however frequently vaccinated; others receive it with difficulty, requiring several operations before it is manifested; in a third, the smallest amount of virus produces the disease with the greatest certainty. In many cases the susceptibility varies in the same person at different times; you may vaccinate him several times without success, but wait a few weeks and then revaccinate, and the operation will be a success. Certain eruptions previously existing upon the surface prevent the reception of vaccination, *e.g.* eczema, impetigo, &c. In order to ensure a safe and efficient vaccination, four or five separate punctures or scratches are required to be made; three are usually made on one arm and two on the other. It affords protection for a period of from seven to ten years, sometimes for a longer time, but it is always safe to revaccinate after that period.

Performance  
of vaccina-  
tion.

Suscepti-  
bility.

*Anomalies of vaccination.*—These depend on—1, the degree and severity of local and general symptoms; 2, the appearances presented by the pock; 3, the duration of phenomena; 4, whether the constitution is protected by it or not.

Anomalies of  
vaccination.

1. *Degree and severity of general and local symptoms.*—Where the virus employed is fresh from the cow the specific inflammation is very severe; the arm swells, axillary glands

Degree of  
symptoms



enlarge, and even fever sets in, but in many cases no serious effects are produced.

Appearance  
of pock.

2. *Appearances presented by the pock.*—It may be only a simple vesicle; or a vesicle broken by scratching so that it loses a portion of its clear contents, and is not circular and umbilicated. The areola may be irregular and premature, yellowish and opaque. Occasionally the body becomes covered with papular eruptions only, which never go on to vesicles, pustules, or scabs.

Duration.

3. *Duration of the phenomena.*—The progress is retarded in cases where the vesicles do not appear till sixth or eighth day or even later, after which period the disease runs its regular course.

Protective  
powers.

4. *Constitution protected or not.*—Where there is protective power the operation within a day, or after two days, is followed by inflammation in the punctures and appearance of pustules, without forming vesicles. The pustules are irregular, yellow, readily broken down, and terminate in a crust, which falls off about the sixth or seventh day. This is otherwise known as *spurious* vaccination.

Sequelæ  
of Vaccina-  
tion.

*Sequelæ of vaccination.*—Under vaccination the system suffers very little. Between the sixth and ninth day there is slight primary fever, and sometimes there may be eruption of roseola or lichen for about a week. Vaccination is sometimes followed by *erysipelas* and *sloughing sores* at the seat of puncture and the surrounding parts. The puncture becomes much inflamed, a pustule rapidly forms, discharging unhealthy fluid, and soon changes into a dark scab, from beneath the surface of which the pus gradually exudes; the scab then becomes detached and leaves an unhealthy and rapidly spreading sore. Such cases are common in those who are ill-fed, keep themselves dirty, and live in filthy localities. Bad results follow from employing lymph and blood mixed; or lymph taken from a diseased subject. In order to

Safe-guards  
against bad  
vaccination.

avoid all these evils the lancet must be perfectly clean. The subject to be vaccinated and the source of the lymph should be both healthy. The lymph should be pure clean lymph unmixed with blood, and taken on the eighth day. If fresh lymph cannot be obtained, it can be well preserved in hermetically sealed capillary tubes. Where economy is the object the lymph may be diluted with ten parts of glycerine or water. Lymph is apt to be spoiled by keeping, but tube-preserved lymph may be relied upon. Direct vaccination from arm to arm is by far more effective than even that with direct lymph from a cow. Statistics have proved that animal vaccination by the successive transmission of vaccination from calf to calf, and from the calf to the human subject, has been attended with failures.

Direct  
vaccination.

Compulsory vaccination has now been introduced into Bombay, and public vaccinators are appointed for different districts. It is gratifying to find that the majority of parents are always anxious to have their children vaccinated, and that it is only a few who, from mere prejudice or religious scruples, object thus to procure safety for their children.

Compulsory  
vaccination.

### MEASLES.—MORBILLI.

*Measles* is an epidemic and contagious disease, most common in children, occurring once during life, and characterised by nasal catarrh, sneezing and running from the eyes, dry cough and hoarseness of voice, continued fever, and a peculiar rose-coloured rash scattered over the skin. The *rash* appears on the fourth day on the face, usually on the chin, in the form of dots, like flea-bites, which soon coalesce into crescents, and it ends on the seventh day by desquamation. Between the patches the skin is normal. There is a slight branny desquamation. There are two forms, *rubeola vulgaris* or mild, where the erup-

Measles.

Definition.

tion is rosy, and *rubeola maligna* or severe, where the eruption is of a dark purple colour.

*Rubeola vulgaris.*

*Rubeola vulgaris* is a contagious eruptive fever, and is most common between one and two years of age. It sets in with primary fever, which continues till desquamation.

Symptoms.  
Stages.  
Incubation.

*Symptoms.*—*Incubation* lasts from nine to ten or twelve days, during which period the patient suffers from languor, lassitude, sense of discomfort, and cough.

Invasion.

*Invasion* is characterised by rigors, and catarrh of the mucous membranes of the eyes, nose, fauces, larynx, and bronchi. The conjunctivæ and the pituitary membranes also are affected; we have thus suffusion of eyes, swelling of lids, intolerance of light, troublesome sneezing, great dyspnoea, hoarseness of voice, and hacking cough. There is high fever on the second day and various nervous derangements, as headache, pain in the head, confused mind, and drowsiness, but no delirium. Derangement of the stomach causes nausea, retching, vomiting, and diarrhoea; the tongue is furred and white all over. In children convulsions precede the eruption, and occasionally there is bleeding from the nose. The stage of invasion lasts from three to four days.

Eruptions.

*Eruption* appears on the fourth day of the fever as small circular dots or red papules, which coalesce and form blotches of a raspberry colour, of a horseshoe or crescentic shape, and slightly raised above the surface of the skin. They appear first on the chin, cheeks, forehead, or face, and when the face begins to become clear they extend downwards and attack the legs. The eruption begins to fade in twenty-four or forty-eight hours, or on the fifth, sixth, or seventh day of fever, and is attended with slight desquamation of the cuticle and with considerable itching. In some cases the eruption is retarded, and in others it even recedes almost at once after appearance. The fever does not abate on the appearance of the eruption, it some-

times augments, so that a very high temperature is attained after the eruption is developed. The skin is hot; irritation of the eyes, nose, and even coryza, continues; the face, eyelids, and cheeks look red and humid and turgid.

*Characteristic symptoms.*—The patient may be very ill on the first day of the invasion, but on the second or third day he is often doing well, on the fourth day again all the symptoms become aggravated; there is lachrymation, nasal discharges, swelling and watering of the eyes, cough, and fever, the breathing becomes hurried, and eruptions appear on the forehead. The sixth day is usually full of danger, but on the seventh or eighth day the temperature begins to fall and the symptoms gradually abate or disappear. The temperature rises rapidly at first, and is as high as  $103^{\circ}$  or  $105^{\circ}$  on the fifth day; it then falls again, when the eruptions begin to decline. In some cases measles appear without eruption, and often without catarrhal symptoms.

Charac-  
teristic  
symptoms.

*Complications.*—Inflammation of the lungs, larynx, or bronchial tubes, and of small intestines; or diarrhœa; ophthalmia; phthisis; and other tubercular manifestations, as tubercular meningitis. A form of periostitis has characterised some epidemics. The chief precautions ought to be directed against lung complications. In adults particularly measles are very often followed by phthisis.

Complica-  
tions.  
Enteritis.  
Ophthalmia.  
Tubercular  
meningitis.  
Periostitis.  
Phthisis.

*Sequelæ.*—The commonest sequelæ of measles after lung symptoms is *otorrhœa*. *Eczema* of the scalp occurs often, and *albuminuria* rarely.

Sequelæ.  
Otorrhœa.  
Eczema.  
Albuminuria.

*Prognosis.*—Is *favorable* when the disease is primary, the initial stage of proper duration, the fever moderate, the eruption appears first on the face, and decreases after two or three days. The fever diminishes with the eruption, and cough diminishes with the fever. Convulsions towards the decline are much more serious than when they set in at the onset. The *unfavorable* cases are marked by the

Prognosis.  
Favorable.

Unfavorable.



severity and continuance of the initial stage ; with extreme irritability ; the postponement of eruption, or its irregular appearance, or sudden disappearance of rash ; and lung complications ; or great prostration, severe dyspnœa, restlessness, delirium, or coma.

Treatment.

*Treatment.*—Avoid exposure to cold, keep the room warm, put the patient to bed, dip his feet in warm water, and apply mustard to his chest every night ; give nutritious but liquid diet very frequently, and in small quantities. Treat the cough or any other complications as they arise after the disease has subsided ; take care not to allow the patient to go out of doors too soon. During convalescence nutritious diet, tonics, and animal food, are useful ; tepid baths are also recommended. Should the eruption soon after it has appeared retrocede and symptoms of internal irritation set in, try and remove the irritation by warm drinks or warm baths.

Rubeola  
maligna.

*Rubeola maligna* may be epidemic or sporadic.

Symptoms.

*Symptoms* are adynamic from the first, they depend on a vicious state of the constitution or on unfavorable hygiene. The pulse is frequent, there is great prostration, oppression of the chest, dyspnœa, delirium, or stupor. Sometimes there are petechiæ over the body or there is soreness of the fauces, with bloody discharge from the nose or the intestines. Eruption comes on slowly and is imperfect, and of a dark purple colour. This malignant form is allied to purpura hæmorrhagica. Death occurs from exhaustion or from congestion of the brain or lungs, or from hæmorrhage.

Complica-  
tions.

*Complications.*—Inflammation of the mucous membrane of the pharynx, larynx, of the lungs, and intestines. Bronchitis and pneumonia are common during the initial stage.

Treatment.

*Treatment.*—The prostration may be relieved by stimulants and tonics ; complications must be treated as they arise.

## EPIDEMIC ROSEOLA (RÖTHELN).

Epidemic  
roseola.  
Definition.

*Epidemic roseola* is a contagious disorder often confounded with measles. It is a specific eruptive fever and most common in hot seasons, and affects children more than adults.

*Symptoms.*—The *incubation* stage lasts for about a week; the rash then appears. Diarrhœa or convulsions in children, and slight headache, occasional rigors in adults; and in either nasal catarrh are the usual symptoms of the *invasion*. The initiatory fever is generally short and often absent altogether.

*Eruption.*—Rash appears first on the face, nose, and cheeks, where it is more abundant than on the upper extremities, and soon spreads over the body in scattered spots. Is at its height on the second day, and then rapidly disappears. The rash is of dusky-red or purplish hue, of irregular shape, not crescentic, not elevated, is coalesced over a large surface, in points or larger, and fades on pressure. Often on the face the rash is papular.

*Decline.*—This stage is attended with considerable itching followed by desquamation.

*Diagnosis.*—From measles. In this affection the contagion is less active than in measles. There is no soreness of the eyes, no lachrymation, very little if any sore throat, no watering from the nose, no sneezing, very little fever, and generally the patient expresses himself throughout as being perfectly well. It occurs in children who have had measles a short time previously.

*Treatment.*—Keep the child away from school or family of children. Mild and cooling drinks and confinement to bed are all that is necessary.

## TYPHUS FEVER.

Typhus  
fever.  
Definition.

*Typhus fever*, from *Tuphos* (Greek), a word allied to the Sanscrit Dhoopa (sun-ache), is a lethargic febrile disease. The patient, lies on his back in a state of half consciousness

Characters.

or in low muttering delirium, and is suddenly deprived of his senses. The fever is eminently contagious, and also infectious. It prevails epidemically during periods of general scarcity; and is an accompaniment of destitution, and found in overcrowded and ill-ventilated dwellings. It is seldom or never seen in India. The duration is from ten to fourteen days, and it ends in a definite crisis.

Causes.

*Causes.*—All depressing bodily or mental influences, such as intemperance, over-fatigue, bad food, lowering or exhausting diseases, over-crowding of houses, or accumulation of a large number of individuals in an ill-ventilated room, predispose to it. It is a disease of large towns, hard times, and of the winter season.

Symptoms.  
Incubation.

*Symptoms — Stages.*—*Incubation* lasts from one to twelve days. The patient feels slight chilliness, languor, pain in the back, thirst, loss of appetite, restlessness, nausea, vomiting, sometimes headache, and cold creeping sensations over the body.

Invasion.

*Invasion.*—In this disease, as in pneumonia, in intermittent fever, and in pyæmia, as distinguished from all other febrile disorders, there is a *single violent rigor*. The patient has a heavy dull apathetic look, dark flush of the face, bloodshot eyes. The eyelids droop, there is also a characteristic odour, great prostration, and irritability amounting to delirium, restlessness, and wakefulness; severe headache, and confused mind; the lips are covered with sordes, the tongue is dry, brown, and tremulous, and protruded with difficulty; the patient feels great thirst, and has total loss of appetite; the bowels are usually costive; the pulse is rapid and frequent, from 150 to 160 per minute; the skin is hot and dry, the respirations are

Pathogno-  
monic  
symptoms.

Temperature.

very hurried; the temperature rises suddenly at the outset, and there is very little difference between the morning and the evening remissions. It rises very rapidly, from 98·4° to 105°, during the first week, and often the

first two days of the attack. In severe cases the *temperature* further increases for two or three days, and after the fourth day it falls slightly, but there is no remission on the seventh day. In mild cases the temperature, which has risen on the third or the fourth day to  $105^{\circ}$ , remains stationary till the end of the first week, and after that period there is a decided remission, when the temperature slowly and steadily falls to the normal, or considerably below it, till the period of crisis, or about the end of the second week. If a high temperature be maintained in the second or third week, or an unusual rise takes place, some inflammatory complication may usually be presumed to be present. The *fever* lasts for about ten days, increasing slightly in the beginning of the second week, and continuing till the end of the attack. It often increases in intensity in the beginning of the second week, and diminishes with the crisis. The crisis occurs on the fourteenth day of the fever.

Fever.

*Eruptive stage.*—The rash appears between the fifth and sixth day of the fever. It consists at first of a few irregular spots of a dark colour, slightly raised, and disappearing on pressure. They may be either few and single and easily defined, or numerous and coalesced. They first appear on the hand, or on the back of the wrist, and rarely on the back or face. In a day or two they become of a brick-dust colour, are mottled gradually, and are ecchymosed or hæmorrhagic. They are now persistent, or do not fade on pressure, and soon become flat. The eruption is absent in persons under fourteen and in rare cases in adults. It remains till the end of the attack, no fresh crops appearing. In *unfavorable* cases the symptoms become aggravated; between the twelfth and the twentieth day the tongue is very dry and brown, or even black, covered with sordes, and the patient cannot protrude it. Drowsiness, wakefulness, and prostration increase; the patient cannot even

Eruptive stage.

Unfavorable cases.



turn in bed and is unable to raise a limb. There is great tremulousness of the hands, of the tongue, and of the muscles about the mouth. The features look extremely wasted and pinched; the breath has an ammoniacal odour. The patient lies listless, with eyes half closed and mouth open, and constantly slips down in bed. The urine is scanty, high coloured, or suppressed; it contains a large quantity of urea, and chlorides are deficient; albumen may be present. In about the ninth or tenth day of the fever there is profound somnolence, subsultus tendinum, and involuntary passage of urine and fæces, ending in coma vigil, uræmia, convulsions, and death. Danger increases with the age. The percentage of mortality is 1 in 5. In *favorable* cases the crisis sets in. It is ushered in by diarrhœa or profuse sweating, or copious deposit of urea in the urine, or prolonged sleep, and there is gradual subsidence of pulse and temperature. There are also abatements of the nervous symptoms, the muscular power returns, the eruption fades away, the tongue becomes clean, appetite improves, and sleep is restored. All these changes occur between ten and fourteen days. The *delirium* is peculiar; it does not occur before the end of the first week, and is generally low and muttering, but occasionally violent and maniacal. Delirium is often a mere wandering for two or three minutes, and then the patient feels that he has been talking nonsense and recovers himself. It gradually passes into illusions and aberrations, until the patient falls into a very quiet and long sleep, from which he awakes free from delirium.

Favorable  
cases.

Delirium.

Complica-  
tions.  
Lungs.

*Complications.*—Hypostatic congestion is common, and may lead to *bronchitis*, *pleurisy*, or *pneumonia*. In rare cases inflammation of the brain and its membranes occurs. Other complications as gangrene of the extremities, and bed sores, are common.

Sequelæ.

*Sequelæ.*—In the debilitated condition which necessarily

follows so severe a fever, the patient under favorable circumstances may become phthisical; but there are no special sequelæ of typhus.

*Diagnosis.*—The only diseases with which typhus fever is likely to be confounded are those others which begin with a single violent rigor and typhoid fever. The differential diagnosis will be found under the head of typhoid fever. At the very beginning of typhus the absence of herpes will distinguish it from pneumonia. Pyæmia usually affords a discoverable source of infection in the body, and intermittent fever reveals its true character in a few hours. Diagnosis.

*Prognosis.*—The rate of mortality under 20 is very low; the statistics of the London Fever Hospital show a mortality under 5 years of about 6·69 per cent., under 15 years about 2·28 per cent., between 20 and 30 years it rises to 10·33 per cent., and upwards it amounts to 50 per cent., and at 75, to 85 per cent. In a typical case convalescence begins about the thirteenth day. Death may occur from prostration or from pyrexia on any day up to the crisis, but after that it is usually due to some complication. Prognosis.

*Treatment.*—To check the epidemic the cause must be removed. To do this efficiently it is often necessary to pull down old houses and let the ground be thoroughly aerated. The poor must be fed and well housed, and have pure air; in houses 2250 cubic feet of space should be allowed for each inmate. Thorough cleansing and lime washing of houses is essential; and clothes, bedding, and excretions should be disinfected or burned. The life of a patient with typhus fever is in the hands of his nurse. He must be constantly fed with small quantities of liquid concentrated food and stimulants must be given. Even in severe febrile cases stimulants are not contra-indicated, for under their use the pulse becomes less frequent and more equal, the countenance less anxious, and the trembling of the hands also diminished. It is essential Treatment.

that he be fed all night, and it is a significant fact that fatal cases of typhus usually end in the early morning.

Bed-sores should be prevented from forming, and attention should always be directed to the bladder. Extreme pyrexia, as in typhoid fever, may be treated by cold baths.

Plague (Pestilence).

### PLAGUE (PESTILENCE).

History.

*Plague* is a contagious fever, attended with extreme prostration and by development of buboes and carbuncles. It is said to be endemic in Egypt, where it is also epidemic. Privation, filth, overcrowding, and unhealthy condition of the soil and atmosphere predispose to it. It is more common among the poor and ill-fed and hard worked than among the rich and those who lead an easy life, and it is carried by fomites, by the breath, and by inoculation. When it was a common disease fear seems to have spread exaggerated reports of its extraordinarily contagious nature, and we may believe that most of the stories of its being conveyed long distances in very occult ways and after lapse of a long time, were due to circumstances which were rather seized upon to account for an outbreak than proved to have caused it.

Post-mortem appearances.

*Post-mortem appearances.*—There is rapid tendency to decomposition, the blood is fluid, the various internal viscera are engorged and soft. There are extravasations in the submucous and subserous tissues. The lymphatics are swollen, enlarged, and a few of them suppurated.

Symptoms.

*Symptoms.*—The disease sets in suddenly with rigors, followed by fever, frontal headache, pain in the back and limbs, and vomiting. The pulse is small, frequent, and irregular. The nervous system is much depressed, the face is dull and apathetic, and the patient soon passes into delirium, coma, or convulsions. Typhoid symptoms soon follow, the bowels become loose, and there is occasionally suppression of urine. Hæmorrhages from mucous surfaces are common. In this fever there is no

true rash, but within two or three days petechiæ appear over different parts of the body, with swellings of the lymphatic glands in the neck, axillæ, or groins; while carbuncles also appear in the extremities and back. These symptoms continue till the beginning of the second week, when the glands either subside or suppurate. Many patients die on the fourth or the sixth day, but in severe cases death takes place within twenty-four hours. In some cases the patient apparently goes safely through the attack, and after two or three weeks of apparent convalescence dies from complications.

*Diagnosis.*—Often confounded with typhus fever. The petechiæ are common in both, but buboes or carbuncles are rare in typhus. In typhus there is true rash, which is absent in plague. In plague death occurs much earlier, for in typhus death is seldom seen within twenty-four hours. The percentage of death is greater in plague than in typhus. Diagnosis.

*Treatment.*—The treatment is on the same general nature, and has the same details as that of typhus. Treatment.

### TYPHOID FEVER (DOTHINENTERIA).

*Typhoid fever* (otherwise called Enteric Fever, and by the Germans Abdominal Typhus) literally signifies like typhus, with which it was till recently confounded. It is a continued fever associated with a definite intestinal lesion. Unlike typhus it is not markedly contagious. It is epidemic, and slightly communicable. Typhoid  
Fever.  
Definition.

*Causes.*—It is due to want of proper sanitation, to the emanation of effluvia from foul drains, or to the contamination of drinking water with the decomposing sewage matter. Evidence is conclusive on these points, but it is true, as has been urged against this theory, that workmen in sewers do not get typhoid. It attacks the rich and the poor alike, and is a disease of the former rather than of the latter half of life. Causes.

*Pathology.*—The poison is conveyed through drinking Pathology.



water, or milk, or through the air we breathe by the lungs. The chief sources of the poison are sewage, leaky drains, or cesspools. During the outbreak of this fever in London in 1876, milk was found to have been the vehicle for the distribution of the poison. The milk was supplied by a certain dairy in the country where the water used for cleaning milk pails was found to be contaminated with the poison. When it occurs in infants it takes on a modified form, and is called infantile remittent fever.

Post-mortem  
appearances.

*Post-mortem appearances.*—The abdomen of a patient who has died of typhoid fever is always distended. On opening the body the abdominal and pectoral muscles are seen to be pale. The intestines are distended throughout, and reddened in parts. A little lymph may be found on their surface, even if perforation has not taken place; if it has, there is usually a good deal of lymph, and much adhesion. The mesenteric glands and the spleen are enlarged and soft. The liver and kidneys are swollen and soft. The lungs may exhibit some stage of pneumonia if that complication has been present, or they may be simply œdematous. The heart is pale, soft in texture, and occasionally a good deal dilated. Some observers have noticed an albuminoid deposit in the fibres of the heart and other muscles. These appearances, with of course considerable variety in relative degree, are common to all cases of typhoid fever. The internal appearances of the intestines depend upon the day of the fever at which the death has occurred. If the patient die in the first week, the Peyer's patches are very prominent, and their surface corrugated. The French speak of them as button-like, and the term describes their great projection very well. If death have occurred near, but not after, the twelfth day, this projection is not nearly so well marked, and commencing ulceration may be found on the corrugated surfaces of the Peyer's patch. After the twelfth day the

Internal  
appearances  
of intestines.

typical typhoid ulcers are found, and the button-like appearance is no longer present. The typhoid ulcer occupies the position of a Peyer's patch. It is always situated on the unattached part of the bowel, which ought therefore in post-mortems in such cases to be carefully slit open along the mesenteric line. It extends in the long axis of the bowel, and never tends to encircle the whole inside of the intestine. Its edges overhang, so that they float up when water is poured into it. Its base is occupied by a yellow stained slough, distinguished from a piece of fæcal matter by the fact that it is not washed away by a gentle stream of water. The ulcers vary in depth, and may rest upon the submucous tissue, the muscular layer, or even the peritoneal covering, or they may perforate the peritoneum. In this last case large quantities of fæcal matter are not found loose in the peritoneum, but a small quantity of fæces closed in by adhesions and recent lymph are usually found close to the point of perforation. The ulcers vary also in size; the largest are usually found near the ileo-cæcal valve. As a rule the large intestine is free from ulceration, but sometimes it exhibits large dysenteric sloughs, and sometimes there is continuous ulceration from one side to the other of the ileo-cæcal valve. Throughout the intestines in the early stages of the disease the solitary glands may be enlarged, and they are sometimes ulcerated in the later stages. If death occur (probably from exhaustion) on the eve of convalescence, stains which represent the destroyed glandular tissue are found, but a typhoid ulcer in healing never causes any contraction of the gut. After death apparently due to diarrhœa the question may arise as to whether ulcers found in the small intestine are due to phthisis or to typhoid fever; if to the former, a group of minute tubercles will generally be found beneath the ulcer on the peritoneal surface of the intestine, but in the absence of any obvious morbid growth other points

Ulcers.

Seat.

Diagnosis of ulcer.

determine the question conclusively. Ulcers due to phthisis tend to encircle the intestine; they are transverse, while those of typhoid fever are longitudinal. The edges of tuberculous ulcers are thick and slope outwards, while those of typhoid ulcers overhang and are very thin. After burns ulcers resembling in every particular of structure simple ulcers of the stomach are found in the duodenum; their locality and the stepped punched-out character of their walls distinguish them from typhoid ulcers. The sloughing of cholera and dysentery, besides that it occurs in great patches and not in well-defined ulcers, is usually sufficiently distinguished from the typhoid lesion by being found in the large and not in the small intestine.

*Symptoms.*—*Incubation* sets in insidiously. The period varies from ten to fourteen, or even to twenty-one days, during which time the patient feels languid and uneasy, and experiences general fatigue and aching about the body, and attends listlessly to his business. The mind is dull, and the bowels are rather loose, with pale stools.

*Invasion.*—After a day or two the patient complains of irregular chills, flashes of heat, headache, lassitude, with tendency to drowsiness by day and restlessness at night, followed by wakefulness and dreams. There is great thirst, loss of appetite, and occasional epistaxis. The tongue is coated white in the middle, and florid at the tip and edges and the limbs are painful and weak. There is a marked flush on each cheek. The pulse is dicrotous quick, and feeble; and the breath offensive; the abdomen is swollen and tender to the touch, there is increased dulness in the region of the spleen; the patient has vomiting and diarrhœa, which though sometimes absent are often most characteristic symptoms of the onset of the disease. There is disinclination to sit up, and change of posture gives no relief. At night the skin becomes hot and dry. The temperature is generally  $104^{\circ}$  or  $105^{\circ}$ . There is

general loss of strength; the countenance becomes haggard, pale, and sad; and the eyes sunken (though bright at first); the urine is acid, high coloured, sometimes scanty, with excess of urea and uric acid, with a trace of albumen, but no chlorides. There may be retention of urine now and then. The fever is slight, but increases towards the evenings, and subsides towards the mornings. During the first week, though the symptoms increase in severity, the patient may be disinclined to keep his bed. As the case advances, and during the beginning of the second week, the fever reaches its height; the skin is dry and hot, but often alternately wet with perspiration, the pulse is generally above 120, feeble, small, and irregular; the respiration is rather hurried, the breath more offensive, the lips parched and cracked, the tongue may continue furred white but generally is cracked, red and glazed, or dry and brown, and increased tenderness in the abdomen. The vomiting has subsided but the thirst and loss of appetite continues. There are often sore throat, great depression of spirits and delirium. The temperature is characteristic, even though the pulse indicates little deviation from health; the evening temperature is higher than the morning by one degree, and this characteristic temperature is retained throughout the disease. It rises gradually towards the end of first week, and in the evening it is often two degrees higher than it was in the morning, whilst the next morning it is one degree less than the preceding evening. At the end of the first week it slowly falls to the normal degree, and although there is no increase in the evening temperature, the morning temperature is still characteristically less than the evening. During the second week the morning temperature generally continues low, but during the third week there is an increase in the morning temperature. In favorable cases the difference between the morning and the evening temperature is very

First week.

Temperature.

Favorable cases.



striking, although the fall is very gradual. A permanent and constant temperature of  $104^{\circ}$ , or an increase in the morning over an evening temperature is unfavorable.

Unfavorable.

Eruption.

*Eruption* begins to appear about the seventh or eighth day of the fever. It occurs in crops, each lasting for three or four days. The whole duration of the eruption varies from seven to twenty-one days. It appears first on the chest or abdomen as rose-coloured papular spots; here and there scattered about a line in diameter, circular, and sometimes slightly raised. These spots disappear completely on pressure, and reappear when pressure is removed. They fade away in from three to five days, and reappear in crops till the end of the fever; but are rare after the thirtieth day. In 10 or 12 per cent. of cases the fever runs its course without any rash, or the eruption only consists of thirty or forty spots.

Crisis.  
Favorable.

Unfavorable.

*Crisis.*—Is not well marked but in favorable cases at the end of the second week, sudamina appear on the neck, chest, abdomen, and inguinal regions, and the temperature falls to  $98.4^{\circ}$ ; in unfavorable cases, after the middle of the second week, the intestinal symptoms become well developed, the belly is much enlarged and tympanitic; increased pain and gurgling in the right iliac fossa; the spleen is enlarged; there is nausea, vomiting, and increased diarrhoea. The stools are alkaline, of pea-soup consistence, and often containing shreds of slough and sometimes blood; the patient passes into a typhoid condition. The pulse and temperature both rise in frequency and intensity, and remain high. There is ringing in the ears and deafness and diarrhoea persist. There are sordes about the teeth and gums, and there are mental confusion, delirium, hiccough, bed sores and extreme prostration. The patient never asks for food, and takes it only on being urged. In some cases the delirium passes into stupor, tremors, sub-sultus tendinum, and involuntary passage of urine and

fæces takes place followed by coma, and death. Ulcers in the ileum and cæcum may perforate, and cause death by peritonitis, or death by collapse. In other cases there are hæmorrhages, owing to the general congestion of the mucous membrane or caused by ulceration into the blood vessels. These hæmorrhages in rare cases are salutary when due to the first cause, and the patient after hæmorrhage commences to recover. The convalescence usually commences in the course of the fourth week. During convalescence the fever slowly subsides, the pulse falls in frequency, the tongue becomes clean, the appetite improves gradually, diarrhæa ceases and delirium disappears. The patient is able to sit up in bed.

Conval-  
escence.

In cases seen in Bombay the symptoms generally described are not always present in every case. With some the tongue continues moist, and there is no eruption, no delirium, and the patient is scarcely confined to bed. In others there are no symptoms of gastric derangements, and the bowels are constipated or irregular. The symptoms generally persist in from twenty-one to thirty days. With them the diminution of the temperature and pulse is extremely slow but gradual, and relapses occur. Again, in some cases the pulse is only 96, but the temperature  $104^{\circ}$ ; the tongue may be moist, with heat and flushing of face, and slight headache. There are irregular chills, with loss of appetite, disturbed sleep, and aching of the whole body, and listlessness; there may be constipation or irregular bowels or diarrhœa. Every epidemic, as Sydenham long ago remarked, has its own characters.

Abnormal  
symptoms.

Typhoid fever in young children is sometimes spoken of as *infantile remittent fever*, and presents some variation from the disease as seen in adults.

Infantile  
remittent  
fever.

*Symptoms.*—For a few days the child is peevish, indolent, drowsy towards evenings; restless at nights, and tired on awakening. It sometimes complains of pain

Symptoms.

in the abdomen and of diarrhœa. After a period from five or ten days of vague indisposition the invasion sets in, the skin becomes hot, dry, and covered with perspiration, and when the moisture has dried up the surface again becomes hot as before. For four or five days there are very marked remissions of fever in the morning, when the child also looks dull and languid. There is loss of appetite, great thirst, furred tongue, and tympanitis. The bowels are irregular and stools offensive, and there is tenderness in the right iliac region. These symptoms increase at the beginning of the second week, when the child begins to moan, grinds his teeth, and starts in sleep, also suffers from delirium and vomiting. The expression is more dull and listless. About the middle of the second week the eruptions appear over the abdomen, they are of a rose colour, slightly elevated, and in crops. Towards the end of the second week the symptoms become more marked, the skin is very rough and dry; pulse 140 to 160, and small; temperature rises to  $105^{\circ}$  or more; respirations are very hurried. The child picks at its bedclothes, and there is marked emaciation. Pulmonary complications are common. In favorable cases the symptoms abate at the end of second week, and convalescence sets in, but in severe cases, after the end of second week, the symptoms become more strongly marked; and there is also great thirst, diarrhœa persists, abdomen becomes more tympanitic, and there is involuntary passage of urine and fæces. There is often vomiting. The eruptions of rose spots are more abundant, and appear on the back, thorax, and abdomen. Delirium becomes more severe, the tongue brown and glazed, the abdomen more tender, the urine more scanty and higher in colour. The patient is at last almost reduced to bones, but very often, even after this state is reached, a gradual improvement takes place.

Favorable  
cases.

Unfavorable  
cases.

*Duration.*—In favorable cases typhoid fever lasts from twenty-one to thirty days, but it may be prolonged to beyond the fortieth day. Relapses are very common. Duration.

*Sequelæ.*—The most remarkable sequel of typhoid fever is paraplegia, which may be so complete as not to differ in any symptom from the result of spinal injury. It, however, always gets well. Otorrhœa and other slighter sequelæ are associated with the condition of debility, and there is sometimes a prolonged dyspepsia. Sequelæ.

*Diagnosis.*—Typhus and Typhoid Fever were long confounded, and were ultimately separated by the discovery of the characteristic intestinal lesion in typhoid. In the post-mortem room the distinction is now easy, but at the bedside cases are often seen in which it is difficult for a time, or even throughout the disease, to ascertain under which head it ought to be placed. The chief differences in the symptoms are—in Typhoid the *onset* is gradual, the rigors numerous; in Typhus the *onset* is sudden and there is but one rigor. In Typhoid the *rash* appears on the eighth day, and on the abdomen or chest; in Typhus it appears on the fifth day, and on the back of the hands. In Typhoid the rash consists of successive crops of small isolated rose-coloured spots; in Typhus the rash appears but once, is persistent, and when established, is more like a stain than a collection of spots. Typhoid Fever has a peculiar gradual method of *rise in temperature*; in Typhus the temperature often reaches a very high point within the first twenty-four hours. In Typhoid the *delirium* is active, the patient tries to get out of bed; in Typhus it is a low muttering delirium. In Typhoid the *pupils* are usually contracted; in Typhus they are unaffected. Typhoid *ends* gradually, with tendency to relapses; Typhus ends in a crisis. The terms brain fever, gastric fever, enteric fever, point to the development of symptoms in the direction of the organ named, in addition to or so far as to obscure the more common course of Diagnosis.

Synonyms.



typhoid fever. Brain fever, however, is a term which has been very loosely used ; it is the favorite resort of novelists, and in popular language includes not only Typhus, but any delirious condition of more than very short duration.

Prognosis.

*Prognosis.*—The mortality is about 16 per cent. In favorable cases the fall of the temperature is slow, the diarrhoea and other unfavorable symptoms gradually abate. In unfavorable cases a presentiment of death is often felt by the patient, and the temperature is high (often 105° from the beginning), and sustained so till at a late period ; great fluctuations are observed. The diarrhoea is persistent. There is great prostration, continuous delirium, with twitching and jactitations, hæmorrhage from the bowels, and cerebral and pulmonary complications. Very severe cases of this kind, however, recover so long as perforation does not occur.

Treatment.

*Treatment.*—Outbreaks of typhoid fever can only be prevented by constant attention to drainage. The cause of a bad smell ought never to be left undiscovered for a day.

Drainage.

Drains should be ventilated, and should, as far as possible, be built outside houses. There should be a proper fall for the drainage, and the water supply should be so arranged as to run no risk of contamination from sewage. When an epidemic has occurred all drains and wells, suspected or unsuspected, should be thoroughly investigated. In all public buildings and groups of buildings distinct plans of the system of drainage should be preserved. It ought never to be assumed that leakage has not occurred till the sewer has been thoroughly examined. Sewer gas escapes through very small openings, and these may be caused in all kinds of unsuspected ways. Another source of typhoid fever, which the physician should always have in his mind, is the existence under buildings of disused and forgotten cesspools. The first essential in typhoid fever is that the patient should remain in bed. It is

Rest in bed.

much better to use a bed pan too much than too little. Violent hæmorrhage, aggravation of inflammation, and perforation are often produced by the patient walking across his room, or even using a night stool close to his bed. At the beginning of the disease the bowels are confined, one dose of castor oil may be given. Saline purgatives are to be avoided. After this the known condition of the intestines will prevent the physician from trying to check the diarrhœa, unless the stools are very often repeated. In this case opium may usually be relied on. If the abdomen is tender, a large, thick, linseed poultice should be placed upon it. In cases of extreme tympanitis the old treatment was to put on a blister. This will relieve the distension, but may cause a slough, and is, therefore, to be used with caution. Occasionally violent vomiting occurs. Solid opium is the best remedy. Dilute nitro-hydrochloric acid in doses of ten to fifteen minims may be given three times a day. When the temperature is very high, say  $105^{\circ}$  or  $107^{\circ}$ , and the pulse very frequent and fluttering, and there is low muttering delirium with insensibility, baths frequently give relief. The bath should be of  $90^{\circ}$  at first, and gradually, while the patient is in, lowered to  $65^{\circ}$ . Under it keep the patient for half an hour or till the temperature falls from  $105^{\circ}$  to  $102^{\circ}$  or less. If the patient feels shivering while in the bath, remove him at once to bed and cover him up with blankets. By this treatment the patient surely finds relief and the temperature is lowered, although a slight reaction may come on after a time. Most cases in Bombay so treated have recovered better than under any other treatment. Hæmorrhage in the first week need excite little alarm, and it is usually a sign for increased quietude. If it continue opium and nitrate of bismuth in ten-grain doses are the remedies, and enemata of starch and opium. It should be borne in mind that fatal cases

Of symptoms.

Opium.

Baths.

Hæmorrhage

Diet.

are on record due to lead contained as an impurity in nitrate of bismuth. To fill the rectum with ice has been tried with some success in the hæmorrhage which may occur in the third week or after, but such cases usually prove fatal. *Diet* is all-important in typhoid fever. The physician saves most cases who is most particular about it. Its every detail ought to be written down. Beef tea and milk will form its ingredients for the first three weeks. After that more solid food, beginning with eggs may be very slowly and cautiously given. The vegetable fibres are to be avoided. If vomiting occurs in convalescence it is an indication for a little carefully prepared solid meat. Some physicians give eggs at any stage, and where, as in India, one can be sure that the eggs are perfectly fresh, this may be done safely. Milk disagrees with some patients, and to these sweet whey made fresh and fresh may be given. Some cases need no stimulant, but in most a moderate quantity of wine is useful, and where there is a tendency to collapse wine and even brandy must be given till the tendency is counteracted. Persons already debilitated at the commencement of the attack require large quantities of the stimulant, and for them brandy is best. If pneumonia arise as a complication, a poultice may be put on the back, which is the region of the lung most often affected, but beyond an increase of stimulant no other treatment is called for. Sea bathing with change of air is the best treatment for the paralysis which occurs after the typhoid fever.

Stimulants.

Complications.

## RELAPSING FEVER.

Relapsing fever.

Definition

*Famine fever—Recurrent typhus fever*—is an infectious fever; which lately appeared in Bombay; whither it was imported from the famine districts. It is a continued fever, with bilious symptoms superadded. Like typhus fever, it

is highly contagious, but is unlike typhus in that relapses are often seen. It originates from fatigue, overcrowding, unusual and excessive want, and destitution. Some physiologists believe that in this fever only the blood contains thread-like sporules or fungi; that they enter the system and cause fever. Others maintain that such fungi are generally found in this as in many other fevers, and they are therefore not characteristic of this disease. Dr. H. V. Carter mentions as a special feature in this fever the presence in the blood during febrile stage of a minute parasite, and he therefore called it “spirillum fever.” History.

*Causes.*—It occurs at all ages. In epidemics the indigent suffer, and the upper and middle classes escape. In the Bombay epidemic males suffered more than females. Season or climatic condition has influence over its development and extension. It is most prevalent in India at that portion of the year when malaria is almost absent. It is carried by the atmosphere and by fomites. The poison is generally lost by dilution, and therefore without long exposure strong persons are not affected. Causes.

*Pathology.*—There can be no doubt that the disease is a specific contagium and is absorbed from the excreta of the sick. It is not as yet admitted that during famine the poison is engendered within the body. Some imagine the poison already existing, and believe it to be innocuous except when the frame is rendered low by famine. During the epidemic in Bombay, 1877-78, several were known to be attacked with the fever two or three times at short intervals. Pathology

Quinine does not check the course of relapsing fever. The disease has nothing to do with defective sanitation or want of personal cleanliness. Remove the famine and the fever will soon abate.

*Symptoms.*—*Incubation.*—Its duration varies from two to Symptoms.



sixteen days, and is manifested as in other exanthematic fevers. Very often prodromata may be wanting. The *invasion* is sudden. There are rigors, with pain in the head, and scanty secretions. The fever continues for from three to five days, during which dryness of the skin alternates with perspirations; and a crisis is then ushered in by a slight rigor, and a profuse sweat is soon followed by reduction of temperature and pulse. At the crisis the temperature falls considerably below  $98.4^{\circ}$ , possibly even to  $90^{\circ}$ . The pulse also falls to 40 or 50 in a minute. In relapsing fever the temperature for the first two days rises to  $102^{\circ}$  in the morning, and to  $104^{\circ}$  in the evening. It often increases after the second day to  $108^{\circ}$ . The pulse is very rapid, often as frequent as 130 or 140 in the minute. The patient complains of hunger. Very often the patient is extremely prostrate, suffers from great thirst, pains in the joints, bilious vomiting, often violent and protracted, jaundice, and delirium; pain, and even tenderness, in the regions of the liver and spleen are common. The urine often contains albumen and blood, and may be scanty or even suppressed. At night all these symptoms are aggravated; the patient suffers from violent delirium, frightful dreams, or sleeplessness. In some rare cases, where the urine is suppressed, stupor, coma, or even convulsions, supervene.

There is no characteristic *eruption*, but in a few cases a scarlet rash appears on the legs and abdomen. In many cases the skin is jaundiced. Desquamation of the skin sometimes occurs after crisis, and apparent convalescence is established, but in a few days (usually eight) a relapse occurs, the former symptoms return, but more mildly, and after two or three days the disease ends with a second crisis, and the patient is gradually restored to perfect health.

According to Dr. Carter, the first paroxysms always, and relapses frequently, are marked by the presence in the blood of spirillum. In remittent fever the parasites are absent. The most diagnostic features are the *crisis* which occurs on from the fifth to seventh day and the *relapse* which generally takes place on the fourteenth day.

*Terminations.*—There may be two or three, or even four, such relapses, ultimately ending in recovery, leaving the patient anæmic for five or six weeks. Occasionally the patient passes suddenly into a state of collapse. Death may take place from asthenia and collapse, or from coma or from cerebral complications, or from sequelæ, as pneumonia, or owing to the previously exhausted condition of the patient, but occurs in only about 3 per cent. of cases. Termination.

*Sequelæ.*—The chief are pneumonia, diarrhœa and dysentery, and ophthalmia. Pregnant females generally abort in this fever. Sequelæ.

*Complications.*—Rheumatic affections of joints; affections of lungs; and suppuration of lymphatic glands in the neck, axillæ, or groins. Complications.

*Treatment.*—Rest in bed, good nourishing liquid diet, strong soup, and wine are the best remedies for relapsing fevers. Though the temperature may rise very high, it is not necessary to resort to cold baths, as the disease hardly ever terminates fatally by pyrexia. Treatment.

## DIATHETIC FEVER OR MASKED MALARIOUS FEVER.

*Diathetic fever* is due to diathesis. Many cases of fever in India depend only on general debility or a peculiar diathesis more than on any specific poison, as marsh poison or malaria, and many cases of so-called intermittent fevers are only due to such causes. They yield readily to stimulants and nourishing diet. Several eminent practitioners refer such cases to impaired nutrition, as a result of poor state Diathetic Fever.  
History.

of blood brought on by privations and want of animal and fresh vegetable diet. It is a well-established fact that the inhabitants of the tropics are, in a large majority of cases, subject to scorbutic diathesis, to syphilitic and mercurial cachexia, and to debility from heat. Often as an accompaniment of such fevers, and sometimes without any febrile phenomena being present, enlargement of the liver and spleen occurs, as during the progress of or after the attacks of remittent or intermittent fever. In these cases the enlargement is due to increased number of white corpuscles in the blood, leading to fibrinous deposit and to hypertrophy of their normal structure. Such enlargements are generally permanent, and can only be removed by a slow process of absorption and by improving the deteriorated state of the blood.

In cases of remittent or intermittent fever the hypertrophy is generally due to engorgement, congestion, and even inflammation.

Symptoms.

*Symptoms.*—The patient complains of heat, burning, and dryness in the palms of the hands and in the soles of the feet; there is more or less general uneasiness, and slight headache. The patient has broken sleep and is constantly dreaming. The pulse rises to about 96 or 100, but the temperature remains at  $98.4^{\circ}$ , or if accelerated it seldom goes beyond  $100^{\circ}$ . In a few hours all these symptoms of uneasiness disappear and the patient feels quite well. This state often continues, with intermissions, for weeks or months. In long-continued cases the patient looks dull and anæmic. The tongue is pale and tremulous, the lips blanched, and there is a tendency to hæmorrhages.

Treatment.

*Treatment.*—Try to remove the cachexia. A thorough change of climate is always beneficial, very often a sea voyage should be suggested. Warm baths and tonics are always desirable.

## MALARIOUS FEVER OR AGUE.

Under this heading we include *intermittent* and *remittent* Ague, fever. These fevers constitute a class by themselves, are of a vegetable origin, and depend on miasmata; they are endemic, not epidemic, in character; are not contagious; and have a definite course. There are three distinct stages—a *cold*, a *hot*, and a *sweating* stage, having an indefinite duration and a tendency to recur, which may last for any length of time. The latency of the poison varies. In some persons exposed to its influence the first symptoms of fever are manifest within a few hours, others, although they may be resident in malarious places, at malarious seasons, may be quite free from the effects of malaria while there, and after they have removed to a healthy locality, may have a first attack of ague. It is a well ascertained fact that residents in malarious districts become accustomed to the poison, and therefore less readily contract ague than those newly arrived. Thus cases are recorded of persons going from Bombay during the fever months to Salsette, Bhandoop, Chimboor, or Coorla, who have died from the severity of the effects of these fevers. Ague is a term vaguely applied to two kinds of malarious fever; the one, the *intermittent*, is extremely mild and especially common in the temperate regions; the other, the *remittent* fever, is a fever of the tropics, and is a very severe and dangerous malady. The intermittent fever is characterised by febrile attacks of some hours duration, and is followed by periods or intervals of apparently good health. Thus this fever is divided into types, which vary according to the length of its stages. The attacks occur regularly. These are—1. Quotidian, occurring every twenty-four hours; 2. Tertian, occurring every forty-eight hours; 3. Quartan, occurring every seventy-two hours.

Definition.

Stages.

History.

Intermittent  
fever charac-  
ters.

Types.



## INTERMITTENT FEVER.

Intermittent  
ague.  
History.

*Intermittent fever* or ague is the term applied to a sharp attack of periodic fever. It is due to the absorption of a poison that affects the blood. It is not contagious, and not reproduced in the system. It is generated in marshy grounds, is of vegetable origin, and is quite endemic. It has no definite course or duration. The disease once contracted often returns after cure. It is also called *periodic* or *marsh fever*. There are three stages, cold, hot, and sweating. In these stages there are distinct rigors, followed by paroxysmal febrile phenomena (hot) and ending in sweats (perspiration). There is a fixed *interval* of apparent good health, after which the fever may recur, and this may happen again and again until the cure is effected. The cold stage is short. The paroxysm or the hot stage is longest, and is more severe towards morning. There is a period called the interval, which is the time between the commencement of one paroxysm and the beginning of the next. It is to be observed that the rule is, the longer the interval the shorter the paroxysm.

Stages.

Varieties.

*Varieties*.—The chief are quotidian, tertian, and quartan. All these types are met with in Bombay, Madras, Bengal (mofussil), and Calcutta. *Quotidian*.—It is the most common in summer. The interval is twenty-four hours, and all the phases of fever occur in succession every day at the same hour. *Tertian*.—Most frequent during or after rains. The fever recurs every other day, the interval being forty-eight hours; the hot stage comes on towards noon. It is a common form in England and America, and also attacks those who reside in jungles in India. *Quartan*.—Is most common in winter, and occurs in weak persons. The fever is absent for three whole days and then recurs at the same hour, the interval being seventy-two hours. The fever comes on in the afternoon. In this variety the

Quotidian.

Tertian.

Quartan.

paroxysm is shortest; the cold stage is long. It is a comparatively rare affection. *Double quotidian*.—Where there are two attacks or paroxysms of fever within twenty-four hours. *Double tertian* or *double quartan*.—Where two paroxysms take place within forty-eight or seventy-two hours. Where the paroxysms take place for two successive days, but are mild, and increase on the third day and become severe as at first, the fever is known as *double quartan*.

Double  
quotidian.

Double  
tertian.

*Causes*.—*Predisposing*: fatigue, mental depression, insufficient or improper food, intemperance, exposure to night air, excesses of any kind, or excitement. *Exciting*: poisonous effluvia or miasma from the surface of marshy ground, known as malaria, most probably decomposing vegetable and animal matters. Persons suffering from malaria suffer from different diseases, the disease varying with the predisposition of the individual. Thus, it causes ague in one person, remittent fever in another, dysentery in this individual and cachexia in that.

Causes.

*Symptoms*.—The *incubation-stage* lasts from six to twenty days, and is attended with lassitude, headache, and general malaise, with chilliness, muscular pains, and weariness. The chilliness soon becomes intensely cold, and the cold stage begins with shivering and a cold creepy sensation felt in the back. The shivering soon passes into a severe rigor, with chattering of the teeth and convulsive twitching of the limbs and trunk. The skin is dry, like goose skin, the face looks dusky and pinched, hands and feet wrinkled and shrunken. During this stage the pulse is small, frequent, and often irregular, the breathing quick, with loss of appetite, and often vomiting. The tongue is furred, and somewhat bluish, there is headache and pain in the limbs, sometimes drowsiness. The urine is pale, abundant, of low specific gravity and passed frequently. Duration varies from a few minutes to three or four hours or more. The temperature rises quickly and uniformly till the end of

Symptoms.  
Incubation.

this stage, when it may be  $105^{\circ}$  or even  $106^{\circ}$ . After a time the cold stage subsides, rigors diminish and are replaced by slight flushes. The *hot stage* commences, and the patient feels first comfortably warm and then hot, till the heat becomes intense. The skin is now dry and pungently hot, there are flushes of heat over the face and cheeks; and the temperature continues to rise. The tongue is dry and thirst great; the loss of appetite continues; the pulse is frequent and bounding; there is headache, and restlessness; the respirations are hurried and oppressed, and even there may be delirium. The urine is still abundant, high coloured, and of high specific gravity. Duration varies from two to ten hours, when the hot stage is succeeded by the *sweating stage*. During this stage the patient feels comfortable. Perspiration appears on the face and extends over the whole body. Often he is bathed in perspiration. The pulse now becomes of normal frequency and soft; respirations normal, and the temperature less high, headache disappears, appetite returns, thirst and heat of the skin abates, and all distressing symptoms are relieved. There is scanty dark-coloured urine, urea and uric acid are diminished, the chlorides are increased, and the patient falls asleep. In rare cases, and in asthenic persons, this stage may end in collapse or extreme prostration; in some cases even death results. The duration of this stage is shorter than in either of the other two. The stage of paroxysm may vary from one or two to twelve hours. The cold stage may last from a few minutes to a couple of hours. It has been ascertained by repeated observations that the longer the cold stage, the shorter and milder is the hot stage. In Bombay many cases of fever occur without any cold stage, the attack beginning either with a hot or a sweating stage; sometimes there may only be a violent cold stage throughout, during which the temperature falls below  $98.4^{\circ}$ . The

Hot stage.

Sweating stage.

Asthenic cases.

Collapse.

Anomalous cases.

patient looks extremely anxious and almost dying. In other cases the sweats come on early, are profuse and last for a long time, and the patient soon becomes collapsed. In a few rare cases there is delirium or coma or convulsions during the first two stages, and with the sweats there may be epistaxis or bleeding from the stomach, or from the bowels or from the bladder.

In this fever the rise of the temperature precedes or commences with the cold stage, and when the sweating stage has fairly set in the temperature begins to fall. Generally during the paroxysms there is enlargement of the spleen, with induration. It is especially swollen during the cold stage and often subsides during the interval, with the recurrences of the fever the enlargement becomes permanent. It is then often accompanied by cachexia. Duration varies. With some the ague subsides on removing the patient to another locality. It may remain for months or for years, and may recur at irregular intervals. It is seldom fatal. If death occurs it is usually from exhaustion.

Duration.

*Diagnosis.*—One chill does not prove malaria, as many acute diseases begin with a cold stage. Two chills may be in malaria or hectic fever, but hectic fever has a known cause; the patient is weak and emaciated, the paroxysm is irregular in time and duration; there is flush upon the cheek, and headache is absent.

Diagnosis.

*Complications.*—In intermittent fever the enlargement of the spleen, known as *ague-cake*, is common; in some cases the enlargement occupies about two thirds of the abdomen. The *liver* is also enlarged, indurated, and its functions deranged. There are derangements of all digestive organs. In many and protracted cases bronchitis, jaundice, diarrhœa, dysentery, and head symptoms, and also affections of the bowels are common complications. Protracted cases are followed by anæmia. *Dropsy* is a result of complications.

Complications.



Brow ague.

The kidneys may also suffer from chronic desquamative *nephritis*. The effects of ague poison upon various branches of the fifth nerve is to give rise to neuralgia. That affecting the supra-orbital is especially known as *brow ague*. These neuralgias are periodic, occur in malarious places, and are often associated with a distinct cold stage. In protracted cases in persons who have long resided in malarious places, or who have long suffered from the periodic attacks, some degree of discoloration causing a peculiar dirty complexion is observed.

Treatment  
of cold stage.Treatment  
of hot stage.

*Treatment.*—In the cold stage the patient can be comforted by warm drinks, or hot brandy-and-water, by external warmth, by thick clothing, or medicated fumes of frankincense or lavender leaves may be tried. It has long been the custom in the East to give hot air baths in ague to terminate the cold, and shorten the hot stage, and bring on sweating; but Hippocrates is against the practice, and his experience is that of most physicians in the west. They maintain that though the fit is undoubtedly shortened, the effect is to produce a debility which prolongs the disease and endangers the patient's life. The minute account of the last illness of Alexander the Great, contained in Arrian, shows the bad results of the hot bath system. The King was advised by his Greek physicians, followers of Hippocrates, to keep his room, and to observe a regimen just such as an English physician would order nowadays, except quinine. He did not follow their advice, but chose that of the Persian soothsayers, who ordered repeated hot baths, and frequent visits to a temple. The fever increased upon him owing to this debilitating treatment, and he sank rapidly and died, while in all probability he would have recovered had he followed his Hippocratic advisers. Thus it may be said of the hot bath treatment that it once saved India from a conquest, but this I think is all that can be said for it. During the hot stage cooling drinks, cold

sponging or cold bath, and medicines such as would promote sweating and diminish the temperature and heat of the body are recommended. Attend to the secretions. Quinine, arsenic; bark, salicin, or salicylic acid, may be tried during intermission, in one large dose of twenty or thirty grains, or three or four small doses of eight or ten grains each in twenty-four hours, to be repeated in decreasing doses for some time after an apparent cure. In Bombay quinine, in doses as large as forty grains, is given with desired effect, where the small doses fail to effect a cure. Care should be taken in using very large doses of quinine, for very often they cause collapse, especially when the patient is anæmic. If there be great irritability of the stomach, twenty grains of quinine mixed with plenty of congee may be used as an enema by the rectum, or a concentrated solution of quinine made with spirit or nitro-muriatic acid may be hypodermically injected beneath the skin. In rare cases, where exhaustion accompanies the interval, stimulants with quinine are serviceable. Where quinine alone fails to effect a cure, a combination of it with arsenic or with beberine, or often beberine alone, proves successful. If the patient is also restless and excitable, quinine with Dover's powder will succeed well. Lately trials have been made with salicylic acid or salicylate of soda in fifteen grain doses, as a substitute for quinine, and also during the hot stage to diminish the temperature and to promote perspiration. It may be taken dissolved in biborate of soda, or bicarbonate of soda, or in syrup of ginger. Chronic or long continued cases have a tendency to relapse, and there is also anæmia or cachexia present. In such cases some recommend preparations of iron. It is well to remember that if the patient be delirious and comatose, owing to the severity of the poison, opium should not be used, but quinine may be given with stimulants. In such cases a blister to the nape

During  
intermission.

Quinine.

Salicylic  
acid.

Iron

Prophylactic. of neck, and cold douche to the head prove efficacious. As a prophylactic, nutritious diet, warm and dry clothing, and a due amount of rest, are necessary. During the fever months patients should avoid malarious localities. Residents in malarious localities while in health may take small doses of quinine to avert ague. In cases of poor people, where change is impossible, exposure should be especially guarded against at night, and just before and after sunrise and sunset. If the weather be damp fire may be burned to make it dry. Attention to drainage and to the soil is always necessary in such cases. It takes a long time to eradicate malaria from a locality. In London ague used to be very common, and was accredited with numerous deaths. King James I, Oliver Cromwell, and the poet Marvell all died of ague in or near London in the 17th century. At the present day, though cases are still to be met with in localities through which some of the now covered in streams of the district flow, ague is rare in London as a whole. Agriculture, even tilling of the surface soil, has a tendency to render a district less malarious, though even deep drainage will not entirely destroy the endemic for some years. A belt of trees keeps off malaria, and trees should be planted in all malarious localities. Large districts of Algeria have been rendered habitable for the French through the exertions of M. Trottier, who planted large numbers of Australian gum trees (*Eucalyptus*). It must be borne in mind that jungles and other wild wooded districts are often highly malarious. This is due to the large quantities of decaying vegetable matter which ought not to be present in artificial plantations where there are proper intervals between the trees.

Jungles.

## REMITTENT FEVER.

Remittent  
Fever.

*Remittent fever* is an ague common in the tropics, and far more serious than the intermittent form. There is no

difference of origin between it and the intermittent forms of ague, both arise from the operation of malaria, and present a similar train of symptoms. Their varieties only differ in degree, and may alternate with one another in the same subject. The fever comes on in paroxysms once or twice a day, but does not intermit. It is attended with distinct exacerbations and remissions of the febrile state. In this fever the cold stage is very short, only a few minutes of shivering or a sense of chilliness represent it, or it may be altogether absent. The hot stage is well marked and prolonged, and the sweating stage is imperfect and often merges into a period of remissions. The attack is sometimes sudden, and often may be preceded by premonitory symptoms, as in intermittent fevers. The febrile paroxysm begins with a rigor, followed by a hot stage, which after some hours is followed by sweat and a period of remission, which is generally of the same duration as the hot stage. For a few days the paroxysms increase in severity, and there are distinct exacerbations. The symptoms are more severe than those of intermittent ague. Although the temperature never rises very high, it seldom falls during the remission below  $99^{\circ}$ . There is also no difference between the pulse and respiration ratio. The vomiting during the hot stage is intense and almost black. The tongue is very dry. Headache and pain are very intense, and there is occasional jaundice. Drowsiness and delirium are common. The patient often falls into a typhoid condition.

History.

Cold stage.

Hot stage.

Remission stage.

*Paroxysms.*—Sometimes there are two or three exacerbations in one day. When the exacerbations are many, the remission after each exacerbation is generally very short. The principal exacerbation generally takes place towards evening, and lasts for the whole night, or in some cases for the whole of the next day and next night.

Paroxysms.



The duration of the fever is from ten to twenty days, at the end of which period sweating or subsidence may occur suddenly, and be followed by convalescence, or may leave the patient in permanent ill-health, and liable to continual return. The fever continues and gradually merges into a low typhoid form, or the paroxysms become longer, the remissions less marked, and the patient dies comatose from the intensity of the poison.

Prognosis.

*Prognosis.*—Complications are very common, and they often delay convalescence. It is a very dangerous malady throughout India. In asthenic cases, where the poison is intense, there is no remission, and the typhoid symptoms soon set in with retention of urine, and in some cases hæmorrhages from the mucous membranes, ending in coma and death. I have often noticed that such results have almost always followed the adoption of depressing measures in the treatment. The high temperature, pungent skin, frequent and full pulse and head symptoms, depressed vascular nervous system, and depraved secretions, are most unfavorable signs. They often merge into sudden prostration or collapse; or into convulsions or delirium passing into coma; or into uræmic poisoning and death.

Complications.

Brain.

*Complications.*—Brain, lungs, stomach, or liver. *Brain.*—There is delirium from the first, flushed face, suffused eyes, and intense vomiting, full and bounding pulse; all signs of inflammation of the brain and its membranes; the patient often passes into drowsiness, coma, and death. Where delirium comes on at a later period of the fever, it is of a low muttering character, it shows failure of vital powers, with inflammation and softening of the brain.

Lungs.

*Lungs.*—Bronchitis or pneumonia are very common.

Stomach.

*Stomach.*—There are vomiting, florid tongue, and tenderness at the epigastrium. Jaundice, due to congestion of the liver, is common.

*Treatment.*—It is the same for remittent as for intermittent fever. Try to shorten the exacerbation and lengthen the remission. Carry the patient safely through the exacerbation and prevent its recurrence. The complications should be treated as they arise, so also the urgent symptoms. We have to shorten the period of remission, and thus to diminish the severity of the hot stage. In very robust individuals, with full and bounding pulse and throbbing of the temples, with intense and constant headache and bloodshot eyes, bleeding, leeches, and purgatives or cooling drinks, diaphoretics, aperients if the secretions are torpid, with frequent cold sponging, are useful remedies during the hot stage. During remission give quinine in large doses, and repeat, if necessary, till you cut short the remissions. If, notwithstanding the use of quinine, the exacerbations recur, give, during the exacerbation, salines and cooling drinks and use cold baths. Many use salicine, beberine, Warberg's tincture, and Newberry's fever powder as a substitute for quinine in these cases. Very often, where the remissions are not perfect, quinine, with diaphoretics, and tincture of aconite, of veratria, or arnica, or of digitalis, may be tried with benefit. Under this treatment the fever generally subsides, and the temperature and the heat of skin abates. In ordinary headache, application of cold or ice to the head will suffice, but if persistent, leeches to the temples will do good. If the patient be drowsy a blister to the nape of the neck will be necessary; for low delirium with drowsiness give stimulants by the mouth. Where the patient cannot swallow, nutritive enemata with stimulants by the rectum will do good; and if the temperature be also high add to the stimulants a few drops of tincture of aconite. Complications may be treated on general principles. Anodynes are useful to prevent restlessness if the pulse be not much above 100, and there is no marked determination of blood to the

Treatment

During  
exacerbation.

During  
remission.

Symptoms.

Complica-  
tions.

Anodyne.

**Dangers.** brain. If the pulse be very frequent and weak, the fever persistent for six or seven days without distinct remission, and the patient feels great distress and restlessness towards the close of the paroxysm, even though there be no headache, no delirium or drowsiness, an anodyne should not be given, for in such cases the functions of the heart or brain being already impaired the administration of opium may soon cause atony or suspension of their functions, and lead to death by coma or syncope. If with the fever of seven or eight days' duration there are also head symptoms from the first, as delirium or drowsiness, the administration of anodynes is equally injurious, as it leads to coma.

**Yellow Fever.** YELLOW FEVER (HÆMOGASTRIC FEVER).

**History.** *Yellow fever* is rarely seen in India. It is a contagious continued fever of a very short duration, and characterised by tenderness in the epigastrium, bloody vomit, and jaundice. It is a disease of the tropics, and most common in the West India Islands and Southern States. It attacks all ages of both sexes, and is a contagion of extreme severity, spreading through fomites and excretions, and remaining infectious for a very long time. One attack confers immunity from other attacks.

**Causes.** *Causes.*—Heat, moisture, and general insalubrious conditions assist its development. It is said that it never spreads when the temperature is below 72° Fahr., and does not attack those who live on elevated places.

**Post-mortem appearances.** *Post-mortem appearances.*—These are chiefly noticed in the mucous membrane of the alimentary canal and of the liver. The *liver* itself is soft, yellow, friable, and in a state of fatty degeneration and enlarged; the gall-bladder is empty. *Blood.*—Its serum is yellow, it is of a bad odour, of acid reaction, and deficient in fibrin, and contains excess of urea; there is destruction of red corpuscles. The

*kidneys* are congested and contain fibrinous casts and cells of blood-corpuscles in the tubes. All the tissues of the body look pale and friable. The stomach and intestine contain black vomit, and the mucous membrane is thick, congested, and easily lacerable.

*Symptoms.*—*Incubation* varies from two to fifteen days. Symptoms.  
At the end of this period the patient is attacked with *febrile phenomena*, preceded by chills, severe pain in the back and joints, headache, and a yellowish hue of the skin. This is soon followed by increased temperature from  $98.4^{\circ}$  to  $102^{\circ}$  or  $105^{\circ}$ ; the pulse is very frequent, the eyes are suffused, there is great thirst, and loss of appetite. This state is soon followed by tenderness in the epigastrium and vomiting; the tongue is furred all over except at its tip and edges, where it is red. As the case advances the tenderness becomes more marked and vomiting more frequent, and jaundice appears. On the third or fourth day of the fever vomiting becomes bloody or coffee ground-like, and the stools are dark and tarry coloured. These appearances are soon followed by symptoms of extreme prostration or of uræmia or coma and convulsions. Besides typhoid symptoms, with marked bloody vomiting and jaundice, there are petechial eruptions on the trunk. From the second day the urine becomes albuminous, and often contains blood; later on it becomes scanty and even suppressed. In *favorable cases* the disease ends in two or three weeks. Favorable cases.  
convalescence sets in, and there is subsidence of the grave symptoms. The improvement begins on the sixth day, the patient feels well, passes stools which contain plenty of bile; the face becomes less yellow, and the skin is moist. In *unfavorable cases* the patient becomes collapsed at the end of a few hours; and very often he sinks at the end of the third or the fourth day, when the vomiting becomes black. Death takes place from hæmorrhage into the stomach and intestine. Unfavorable cases.



- Termination.** *Termination.*—At a later period, even in favorable cases, after a slow and apparent convalescence, death often takes place from cerebral complications, or from exhaustion or uræmic poisoning.
- Pathognomic symptoms.** *Pathognomonic symptoms.*—Sudden onset, high fever, frontal and rheumatic pains, epigastric tenderness, and black vomit and jaundice.
- Diagnosis.** *Diagnosis.*—The diagnosis of yellow fever usually presents no difficulty. The region in which the disease occurs, the jaundice, and the violent symptoms, prevent any mistake.
- Prognosis.** *Prognosis.*—The black vomit and the suppression of urine are very unfavorable signs. Death occurs from uræmic poison, exhaustion, or from apoplexy. Mortality is 1 in 3.
- Treatment.** *Treatment.*—Confine the patient to bed and keep the room well ventilated; attend to the urgent symptoms. Remove the patient from the affected locality; from a warm to a cold climate, or from a low to a high land, in a hot climate. Strictly maintain the recumbent posture. Give liquid and nutritious diet. Purgatives are only good at the onset. During the remission give large doses of quinine and nitro-muriatic acid. For vomiting give ice, stomach-soothing drugs, as chloroform, chlorodyne, morphia, or creasote, or opium. If the urine is albuminous use belladonna and omit opium. If all these remedies fail turpentine may be tried. The fever may be checked by warm baths and wet-sheet packing. As there is tendency to collapse use stimulants freely if the urine be free and copious; of these brandy and wines are recommended. Ammonia does harm, and should not be used, as the blood is already ammoniacal.

## DIAGNOSTIC TABLE OF FEVERS.

Name of fever.	Period of incubation.	Temperature.	Day of rash.	Characters of rash.	Site of rash. Beginning.	Complications.	Sequelæ.
Chicken-pox.	1 week to a fortnight	101° to 104°; slowly	1st day	Rosy papules, vesicles, pustules, ending in a scab	Chest, and face	...	General debility for some time.
Scarlet fever.	8 to 14 days	105°; high early	2nd day	Universal, red, ends in general desquamation	Chest; forehead, abdomen, and thighs	Sore throat	Albuminuria (anasarca and uræmic poisoning), otitis interna, with abscess in internal ear, pleuritis or pericarditis, rheumatism
Dengue .....	Uncertain	101° to 104°	2nd day	Erythematous pustule	Hands and feet	Epistaxis, swelling of lymphatics, ophthalmia	Debility and stiffness and swelling of joints.
Measles .....	7 to 21 days	103° to 104°	4th day	Crescentic patches, with clear skin between; ends in branny desquamation	Chin or other parts of face	Nasal catarrh, Laryngitis, bronchitis, pneumonia	Otorrhœa, phthisis pulmonalis, diarrhœa, tubercular meningitis, eczema of scalp
Smallpox ...	7 to 8 days	104° to 106·5°	2nd or 3rd day 4th day 7th day 14th day 5th day	Papule, Vesicle, Pustule, Scab	Alæ nasi and other parts of face	Pneumonia, Albuminuria	Permanent anæmia, phthisis
Typhus .....	Uncertain duration; usually 5 to 14 days	103° to 107°		...	Chest and abdomen, and back of hands and wrists	Petechial stain, like dusky red spots	Debility
Plague .....	Uncertain	...	2 or 3 days	Petechiæ & buboes	Neck and groins	Carbuncles	—
Typhoid fever	Some days; the patient is unable to fix the date of commencement of his illness	104° to 110°; one degree every 24 hours	Beginning of 2nd week or 7th day	Lenticular rose spots in successive crops	Chest, abdomen, and back	Intestinal hæmorrhage, pneumonitis, bronchitis, peritonitis from perforation, dysentery	Tuberculosis, prolonged debility, laryngeal paralysis, paraplegia

## LOCAL DISEASES.

IN the diseases hitherto described the whole body has been obviously affected, and no one locality can be fixed as the seat of the disease. In those which follow, although, of course, the body as a whole is to a varying degree affected, a particular system or spot is the obvious commencement of the disease, and corresponds to the injury in a surgical case.

## NERVOUS SYSTEM.

Anatomy of  
Membranes.

Dura mater  
of brain.

Of cord.

Arachnoid.

Pia mater

*Anatomical characters.*—The membranes of the brain and cord are—dura mater, arachnoid, and pia mater. The *dura mater* of the brain is a thick, inelastic, dense, fibrous membrane. Its outer surface is adherent to the inner aspect of the cranial bones. Its inner surface is smooth and polished, and forms the parietal layer of the arachnoid cavity. It forms septa between the cerebrum, the cerebellum, and the hemispheres. It is continuous with the sheaths of nerves at the base of the brain. The dura mater of the cord like that of the brain, is dense, thick, and fibrous, and extends from the foramen magnum to the lower end of the sacral canal. It forms a loose bag in the vertebral canal, and is separated from the vertebræ by fat and loose areolar tissue, its inner surface is smooth and polished. It is continuous with the anterior and posterior roots of the spinal nerves. The ganglion of the posterior root is within the dura mater. The *arachnoid* cavity is a serous bag continuous throughout, and occupies the interval between the dura mater and the brain, or between it and the cord, and is the largest reservoir for the cerebro-spinal fluid. It lies loosely on the surface and at the base of the brain, never dipping into the sulci. It also covers the cord. The *pia mater* is a vascular layer of membrane,

which lies on the outer surface of the brain, and follows all its inequalities, dips into the transverse fissure of the brain, and into the fissure between the medulla and the cerebellum, and also into the sulci. The pia mater of the cord lies between the arachnoid and the cord, it is more thick, but less vascular than that of the brain. The space left between the arachnoid and the pia mater is known as the subarachnoid space.

*Development of the Brain.*—The brain is developed from three hollow vesicles, which succeed one another from before backwards, and in its adult condition the cavities as well as the walls of these vesicles remain. These three primary cavities are the third ventricle, the iter a tertio ad quartum ventriculum, and the fourth ventricle. They are continuous, and lie in the middle line. The lateral ventricles, which communicate with one another by the foramen of Munro, are hollow in the highly developed cerebral hemispheres. The fifth ventricle is a small cavity within the fornix, and is of no pathological importance.

Development  
of Brain.

*Anatomy of the spinal cord.*—The spinal nerves are connected to the cord by two roots; the *anterior* or *efferent* or *motor* root arises from the anterior surface of the cord, the *posterior* or *afferent* or *sensory* root is connected with the posterior surface. The two roots run a short, independent course, and then join together and form a ganglion. From this ganglion the compound nerve then distributes its fibres in the periphery. The cord consists of central grey matter and the lateral conducting columns of white matter. The grey matter is in the form of a double crescent, the convex surfaces of which are joined by a commissure. The points of the crescents are the forms from which the spinal nerves originate. The *efferent* or motor impulses pass downwards and on the same side from which the motor roots originate; hence, on transverse section of the cord the parts below the section become paralysed, and the para-

Anatomy of  
cord.



lysis of motion is of the same side. The *sensory* impressions are carried upwards to the brain, but in the opposite half of the cord to that from which the sensory roots originate. Hence, on a transverse section of the cord there is paralysis of sensation on the opposite side, but at the same time there will be hyperæsthesia of the same side as the lesion. The *anterior columns* are usually regarded as commissural connections between the motor nerve-fibres and adjacent segments, and not the paths of motor impulses from the brain. The *central grey* matter is regarded as capable of conveying sensory impressions. The *posterior column* is regarded as a tract of tactile impressions, and as a commissural connection between the sensory roots and the adjacent segments, but not from the sensory paths to the brain. This is shown by the fact that extensive destruction of the lateral columns is not attended with absolute paralysis of motion or sensation in any particular part.

Medulla oblongata.

The *medulla oblongata* is an expansion of the spinal cord within the skull, and forms the floor of the fourth ventricle. The spinal nerve-tracts, owing to additional cerebellar nerve-connection and the development of accessory ganglia, do not occupy the same position in the medulla as in the cord. The motor fibres decussate at the extremity of the medulla, at the decussation of the pyramids, and at this point, therefore, the motor impulses from the hemispheres cross to the opposite side of the cord. Hence, the division of one half of the medulla above the decussation of the pyramids would cause paralysis of sensation and motion of the opposite side of the body.

Pons Varolii.

The *pons Varolii* is the further continuation upwards of the spinal nerve-tracts. They form connections between the grey matter of the cord and the transverse commissural fibres of the lateral lobes of the cerebellum. In the pons

the spinal tracts are traversed by some of the cranial nerves, which pass to the medulla oblongata. The decussation of various sensory and motor fibres is complete in the pons, and hence, if one side of the pons be destroyed, there will be paralysis of motion of the opposite side, and also paralysis of the cranial nerves on the same side.

The *crura cerebri* are made up of the fibres from the pons, the cerebral peduncles, and the tracts, and appear as two peduncles or limbs; they diverge as they go upwards and are traversed by the third pair (oculo-motor) of nerves. Each crus contains a separate motor and a sensory tract. The anterior portion or motor tract passes to the corpus striatum and thence by the corona radiata to the hemispheres. The posterior is the sensory (tegmentum) tract, and passes through the optic thalamus to the posterior portion of the brain, both being separated by the nerve-cells called the locus niger. If one crus be divided there will be paralysis of motion and sensation on the opposite side of the body, and paralysis of the third nerve on the same side.

*Crura  
cerebri.*

The *Optic thalami* and *corpora striata*.—These ganglia are situated at the base of the brain—the optic is the posterior of the two—they are enclosed by the cerebral hemispheres. The grey matter of the corpus striatum is divided into intra-ventricular nucleus or nucleus caudatus and extra-ventricular nucleus or lenticular ganglion. These ganglia with the corpora geniculata and corpora quadrigemina are continued through the superior cerebellar peduncles to the cerebellum, and along the crura cerebri to the medulla oblongata. From these ganglia white fibres proceed in a fan-like manner with the apex below to the hemispheres. Thus the grey matter on the surface of the hemisphere is brought in communication with the periphery through the cord.

*Optic  
thalami.*

*Corpora  
striata.*

*Cerebral hemispheres*.—The anterior convolutions of the brain are very large like those of the anterior cornua

*Cerebral  
hemispheres.*

Commissure.

of the cord. Each hemisphere is formed of fan-like radiating fibres from the medulla and encloses ganglia at the base of the brain. The various parts of the brain are connected together by longitudinal and transverse commissural fibres. The hemispheres are two in number and connected together by means of transverse commissural fibres called the corpus callosum. The *corpora albicantia* form a commissure of fibres which converge in front of optic thalami, where they form a twist or loop known as the fornix. The *anterior commissure* is a transverse band of fibres which crosses the anterior pillars of the fornix and traverse the corpora striata. The *posterior commissure* is a tract of fibres which join the optic thalami.

Cerebellum.

The *cerebellum* consists of three pairs of peduncles. The *peduncles* are connecting links of nerve matter which join the cerebellum with the medulla and the pons Varolii, corpora quadrigemina being in front. One comes from the cerebrum, one from the medulla oblongata, and the other is transversely commissural. Its surface is made up of grey matter which, on section, has the appearance of leaflets and is hence called arbor vitæ, and consists microscopically of granules, nerve cells, and fibres. It is made up of superficial grey matter, and of collections of white matter, in which are embedded two ganglia (one on either side) called the corpora dentata. It is connected to the medulla by two inferior peduncles called the restiform bodies, which are especially connected with the posterior columns of the cord through the olivary bodies developed in the medulla. The middle peduncles of the cerebellum is formed of fibres which form the great bulk of the pons varolii, and here they undergo decussation in the middle line, and the fibres of one side pass to the opposite cerebral hemisphere. Hence the right half of the cerebellum is functionally connected with the left hemisphere, and thus a cross relation is established. The *superior peduncles* are

two limbs which emerge from the anterior aspect of the cerebellum, or from the tegmentum of the cerebral peduncles, and through the corpora dentata connect the cerebellum with the cerebrum. These peduncles enter the posterior extremity of the corpora quadrigemina, converge between them and decussate into the fibres of the crura cerebri.

*Corpora quadrigemina* or optic lobes are two ganglia situated on the posterior aspect of the crura cerebri and anterior to the cerebellum and are formed of four tubercles. They are connected with the motor and sensory tracts of the spinal cord and also with the brain. The motor fibres of the cord are connected by a band of fibres formed by the decussation of the pyramids, and which passing upwards, embracing the olivary bodies, enter through the pons and form the inferior and lateral portion of the corpora quadrigemina. The sensory and motor fibres enter the grey matter of the corpora quadrigemina and decussate on its upper surface and form the roof of the aqueduct of Sylvius, and thus connect the cerebral ventricles with the fourth ventricle and the spinal cord.

Corporaquad-  
rigemina.

*Cranial nerves* with two exceptions originate in the medulla oblongata, along the floor of the fourth ventricle, and around the iter. They are of two kinds, the motor and sensory. The motor nerves are the third, fourth, motor branch of the fifth, the sixth, the portio dura of the seventh, the spinal accessory, and the ninth. The sensory nerves are the first, second, the sensory portion of the fifth, the auditory and vagus, and the glosso-pharyngeal of the eighth. *First pair*, the olfactory arises from the olfactory bulb, is connected with the hemispheres by the olfactory tract. The olfactory bulb is joined together by the anterior commissure. *Second pair*, the optic originate from the optic tract which pass round the posterior aspect of the optic thalami, and are connected with

Cranial  
nerves.



two eminences known as corpora geniculata. *Third pair*, oculo-motor; *fourth*, or trochlear, both arise from nuclei in the floor of the iter. *Fifth* is partly motor and partly sensory, lies within the fasciculus teres, and penetrates the pons. *Sixth*, or abducens oculi; and *seventh*, or facial, lie in front of the ninth, *auditory*; *eighth*, or the vagus, the glosso-pharyngeal, and the spinal accessory, and *ninth*, or the hypoglossal all originate from nuclei in the medulla oblongata.

Functions of  
the spinal  
cord.

*Functions of the spinal cord.*—It is a medium of communication between the brain and the periphery; it is the seat of all paralysis. The function of the cord as an independent centre also exists, and is known as a *reflex action*, a term derived from the reflection of the sensory impression back to the periphery. This action is often observed in disease or injury of the cord, where all the parts supplied by the cord below the seat of injury suffer from paralysis of motion and sensation, but if in such cases the soles of the feet be tickled the legs will become convulsed, of which the individual is not conscious, and has no control over them. Now, if the brain and cord are connected and if the brain be active, the irritation of the feet will also excite sensation. The brain itself in some cases has a powerful inhibitory influence over the reflex phenomena of the cord. Thus, some persons with active brain can restrain the movements of the legs if tickled on the soles of the feet. The phenomena of reflex action of the cord are known to vary with the degree and mode of stimulation, a moderate tickling excites withdrawal of one leg, but if the stimulus be intensified there is irradiation in the grey matter of the cord and muscular contractions occur in both limbs. Again, instead of increased stimulus, if the reflex excitability of the cord be heightened, as in strychnine poisoning or in tetanus, the irritation would induce reflex spasm of a general character. These reflex actions also

possess the distinctive features of *adapted movements*, which are either of defence or of preservation, and are adapted to withdraw the part from the source of irritation. A similar phenomenon of reflex action of an adaptive character may be noticed in the functions of organic life. Thus, in retention of urine, the reflex contraction of the bladder can be caused by stimulating their sensory nerves. Similar reflex movements of the viscera may be produced by stimulus applied to certain cutaneous surfaces. Thus, in carbolic acid poisoning when the respiratory nerves are partially paralysed the application of strong ammonia to the skin will cause breathing to continue.

*Automatic action* is a continued operation of the reflex action of the cord. The spinal nerves rule over sets of nerves for particular objects, and the cerebral ganglia by connecting nerve-fibres between them set these centres in action. Thus, in walking we cannot will the action of any one muscle separately, there is some centre which is put in action by the brain through the will, and that centre stimulates the whole group of nerves which supply the muscles in walking. We know that use or habit is a second nature, and hence the act of walking or similar complex actions if once set in motion will always continue in operation. The same is the case with the organic system of nerves and the viscera. Thus, the cord produces various complex movements. This is exemplified in the maintenance of tone in the sphincters, in the blood-vessels, and in the muscles generally. The tonic (automatic) contraction of the sphincters keeps them close. The tone of muscles is to keep constant contraction, which is most manifest when the extensors are paralysed.

Automatic  
action.

*Functions of the medulla oblongata.*—The fifth, sixth, seventh, eighth, and ninth pair of cranial nerves are directly connected with the grey matter of the medulla, which is thus a centre of *reflex co-ordination* of complex actions

Of the me-  
dulla.

Complex re-  
flex action.

manifested in their region of distribution. It has also an intimate relation to essential vital actions. Thus in cases of injury of the brain above the medulla the voluntary motion will cease to exist, the spinal reflex actions will continue as before, and in addition there will be reflex co-ordination, as will be manifested by irritating the regions deriving their nerve supply from the medulla. Thus on irritating the conjunctivæ, the lids will close. A similar complex reflex action will be called forth by a morsel of food put in the mouth when deglutition will be excited to action as before. Cases of monsters without encephalon who suck and swallow are examples of such complex reflex actions.

Co-ordinating  
centre of  
speech.

The medulla oblongata is also a *co-ordinating centre of articulation* as is known by the fact that the muscles of speech are innervated by the medulla, and that the nuclei of these various nerves of speech are connected with each other. Thus in bulbar paralysis, or in cases of paralysis of the muscles of articulation, there is a gradual and progressive paralysis of the tongue, palate, lips and laryngeal muscles and articulation, and ultimately deglutition becomes impossible. Some point to the connections of the ninth or of the facial and of the fifth nerves with the olivary bodies as the co-ordinating centres of articulation.

It is also a centre of the *reflex manifestation of facial expression* and some other forms of *emotional expression*.

Emotional  
expressions.

*Emotional expressions.*—These are chiefly cries of various kinds, as of pleasure or pain, and certain bodily movements, as exhibited under alarm or fear. The expressions soon follow cutaneous and sensory impressions without any conscious deliberation. We may feign emotion, and we may even attempt to restrain it, but emotions, which are outward expressions, will manifest themselves even in spite of our endeavours. These phenomena are best observed under the influence of chloroform; it first destroys

the excitability of the hemispheres, and the consciousness is thus abolished, but the mesencephalon retains its excitability, and hence the groans and cries will continue though painful sensations will be absent. In cases of injury above the medulla, if the toe be pinched, emotional expression of pain will be elicited, and there will be reflex movements of the leg; but in cases of injury to the medulla itself, the facial expression of pain will cease though the reflex movements will continue as an emotional expression.

We know that *co-ordination of respiratory movements* is one of the functions of the medulla, it should therefore be remembered that crying or emotional expression is only a modified form of expiration. In cases of injury to the medulla, the respirations will soon cease and death will result.

The *respiratory tract* is a centre of co-ordination and is seated in a V-shaped apex of the fourth ventricle, and has also its seat in the lateral columns of the medulla and in the cervical portion of the cord known as *respiratory columns*. In injury to the spinal cord above the root of the phrenic nerve, the diaphragm and thoracic muscles cease to act, but in injury to the medulla above the respiratory centre no such effect is produced.

Respiratory  
movements.

The *sensory respiratory impressions* are conveyed by the branches of the vagus to the lungs and air passages, which (at the close of expiration) generate a stimulus to the inspiratory movements and at the close of inspiration excite expiratory movements, or by restraining the inspiratory action allow the thorax passively to collapse. The respiratory centre has also reflex connection with the sensory nerves of the face and chest, hence stimulus of cold water to the face of a new born child whose lungs do not sufficiently act causes active respiratory action.

*Automatic respiratory movements.*—These often continue

Automatic  
movements.



even after the sensory respiratory nerves are divided. This kind of automatic activity is maintained by the state of the blood. The diminution of oxygen and collection of non-oxydised products in the blood, act as a stimulus to the inspiratory centre, and this reflexly excites expiratory movement. Thus in cases where the blood is over oxygenated the respiratory movements cease and apnœa results. Where blood is imperfectly oxygenated, owing to some obstruction to the respiratory functions, the respiratory movements are very powerfully excited, and if obstruction continue it leads to asphyxia, with convulsions of the whole body. The respiratory movements, although reflex, are, to a great extent, under the control of the will, thus we can control respiratory movements in speech and vocal music, and by closure of the glottis and forcible contraction of the expiratory muscles we can voluntarily pass urine and fæces.

Sneezing and  
coughing.

*Sneezing and coughing* are other modifications of respiratory movements; any irritation of the nose excites reflex irritability, sudden inspiratory movements with closure of the glottis, and is followed by forcible expiration which removes the air from the nasal passages. *Cough* is a similar explosive expiration in irritation of the larynx or the bronchi.

The action of the respiratory centre continues long after the reflex action of the brain and cord ceases. Thus, chloroform paralyses the brain and cord before the respiratory centres are affected.

Centre of  
innervation.

*Innervation of the heart.*—The medulla is also a centre of innervation of the heart. The rhythmical action of the heart is due to the ganglia of the heart itself, and is independent of the brain or the cord; but the action of the heart is capable of being modified through the nerves which connect it with the medulla. These nerves serve as *accelerating and as inhibiting* the heart's action.

The *inhibitory action* is conveyed from the medulla by the vagus or the pneumogastric to the heart. Stimulation of the vagus either at its trunk, or the distal end, or at its centre in the medulla causes the action of the heart to stop. Thus powerful irritation of the sensory nerves of the surface generally, or irritation of the sensory branches of the fifth nerve, or of the nose, or larynx, or of the intestinal nerves, cause the heart's action to stop. Similarly, a sudden blow on the epigastrium, or a sudden shock of cold drink on the sensory nerves of the stomach has fatal results. The *accelerator nerves* pass from the medulla down to the spinal cord, and reach the heart through the last cervical and first dorsal ganglia of the sympathetic. These nerves can also be excited reflexly by stimulation of the sensory nerves of the muscles, as is seen in the rapidity of the heart's action in active exercise.

*Vaso-motor centres.*—The blood-vessels are also under the control of the medulla. The nerves of the blood-vessels, known as vaso-motor nerves, pass by the spinal cord, through the medulla to the blood and to the sympathetic vessels. These nerves are automatic or in continued action, and keep the tone of the blood-vessels. The vaso-motor centre is situated in the grey matter on each side of the median line of the floor of the fourth ventricle, and is also connected with the spinal cord. The medulla and the spinal cord are thus concerned in the maintenance of the arterial tone, and the division of the anterior roots of the spinal nerves causes dilatation of the arteries. The vaso-motor centre is in relation with sensory nerves, and which reflexly cause contraction or dilatation of the vessels. Reciprocal relations exist between the vaso-motor, cardiac, and respiratory centres. The blood-vessels and the heart keep variations in the blood pressure within limits. Thus dilatation of the vessel is compensated by increased heart's action, and the contraction of the vessels by inhibition of the heart's action.

Vaso-motor  
centres.

The pulse and blood pressure have also relation with the respiratory movements, and hence the pulse is quickened during inspiration, and slow during expiration.

Thus the medulla is a co-ordinating centre of reflex actions necessary for life.

Functions of  
the Mesen-  
cephalon.

*Functions of the pons Varolii, corpora quadrigemina, and the cerebellum.* These ganglia lie between the cerebral hemispheres and the medulla.

Maintenance  
of equilib-  
rium.

*The maintenance of equilibrium* is one of their functions, and it involves the conjoint action of three separate factors, a system of *afferent nerves*, a *co-ordinating centre*, and *efferent tracts* in connection with movements. The equilibrium is destroyed or altered by lesion of one or all these factors. The maintenance of equilibrium shows healthy tone of muscles, and the lesions therefore destroy the tone of muscles, and according as it occurs in both sets of muscles, or in one group of antagonistic muscles, we have different distortions as exhibited by reeling, staggering, and rotation. *Afferent apparatus*, on which depends due maintenance of equilibrium and co-ordination, include:—1, organs of reception and transmission of tactile impression; 2, organs for the reception and transmission of visual impressions; 3, semicircular canals of the internal ear and their afferent nerves.

Factors.  
Afferent  
apparatus.

Include—  
Tactile im-  
pressions.

Cutaneous  
impressions.

I. *Tactile impressions* include cutaneous impressions and muscular sense. During health afferent nerves receive and transmit tactile impressions without affecting the equilibrium. In locomotor ataxy the tactile impressions are not properly conducted and the equilibrium is destroyed, and the patient complains of numbness in the feet, with diminished or entire absence of sensibility to tactile impressions, so that he feels as if he were standing on velvet. In this disease other forms of sensibility remain intact; thus a cold iron laid against the feet causes a sensation of cold. In the recumbent posture the patient can retain his

voluntary motor power, but when he attempts to walk he loses his balance and staggers or plants his feet irregularly, The disturbance of equilibrium and co-ordination is further seen when the patient tries to stand with the feet close to each other, and the disturbance is intensified if the patient attempts to walk with eyes closed or in the dark. In such cases the disturbance of equilibrium and of co-ordination is compensated by voluntary adaptation and by the visual and auditory (labyrinthine) impressions, but the disturbance becomes complete if the eyes are closed and the patient walks in the dark.

In locomotor ataxy the tactile impression for differences of temperature is manifested on the application of heat or cold. In hysteria the loss of cutaneous sensibility depends on affections of the higher centres above those concerned in co-ordination and locomotion independently of conscious activity.

That equilibrium and the co-ordination of locomotion exist, even if the hemispheres are diseased, shows that consciousness is not necessary for these functions, but where the hemispheres are active the impressions are carried onwards and may be modified.

*Muscular sense*.—The loss of equilibrium in locomotor ataxy may also be due to loss of *muscular sense*, a consciousness of the state of contraction and force exerted by the muscles. Muscles, as a rule, are insensible to certain forms of irritation (mechanical or chemical) which act powerfully if applied to the skin. It is possible that muscles, like the organs of special sense, may be the seat of sensory impressions which are transmitted to the mesencephalon and the cerebellum. It is also true that we can discriminate between weights beyond the limits of mere pressure on the skin by the degree of muscular contraction to raise or sustain them. In case of weights the result is complex ; we have impressions caused by cutaneous contact,

Muscular  
sense.



by pressure, muscular displacement, tension of ligaments, and general bodily strain. All these enter into the composition of the muscular sense. Again, muscles are the seat of sensation of fatigue, and are also distinctly sensible to electrization, which causes a vibratory thrill quite independent of cutaneous impressions. They are also subject to painful sensations or cramps, which are due to compression of sensory nerves passing through them, and not to neurosis of sensory nerves of their own.

Visual im-  
pressions.

2. *Visual impressions*.—The maintenance of equilibrium and co-ordination of movements in disease (ataxy) is possible notwithstanding the default of tactile impression, so long as visual impressions continue unabated. Any derangement of vision causes direct disturbance of the function of equilibrium, although the tactile and labyrinthine impressions may exist. In paralysis of certain muscles of the eye the equilibrium is destroyed and one of the characteristic symptoms is giddiness or reeling when the patient attempts to walk. This abnormal condition of the organs of vision also causes a disturbance in the co-ordination accompanied with vertigo.

Labyrinthine  
impressions.

3. *Labyrinthine impressions*.—These are most important in maintaining due equilibrium. The internal ear or labyrinth is placed in the petrous portion of the temporal bone, and consists of a central chamber (vestibule), which communicates in front with the cochlea, and behind with semicircular canals. Its outer aspect opens towards the tympanum or drum of the ear. During health the head is stationary and an equilibrium exists, although with each variation of position the tension on the ampulla will become altered. Thus, inclination of the head to the right will cause increase of pressure on the left horizontal canal. When the semicircular canals are injured or diseased the equilibrium is greatly disturbed. This is best illustrated in Meniere's disease. Thus, when the horizontal canals

are divided there are rapid movements of the head from side to side in a horizontal plane, with oscillation of the eyeballs, and the patient spins round as if on an axis.

In division of the inferior canals the head is moved rapidly backwards and forwards, and the patient walks backwards. In division of the superior canal the head is moved rapidly forwards and backwards, and he walks leaning forwards. The nature of these impressions seems to depend on the degree and relative variations of endolymph in the ampulla of the membranous canals on which the vestibulæ are spread. Besides the influence of tactile, optic, and labyrinthine impressions, we have also some influence of *visceral* impressions on the centre of equilibrium. Thus, where equilibrium is altered we have a sense of depression, and nausea and vomiting.

Visceral  
impressions.

*Co-ordinating centre or centre of co-ordination of locomotion.*—In injury to or disease of the cerebral hemispheres co-ordination of locomotion exists undisturbed. It is a fact of every day observation that the function of locomotion is carried on regularly without attention, and without consciousness, while the cerebral hemispheres are engaged in other directions.

Co-ordinating  
centre.

*Efferent apparatus.*—The functions of equilibrium and of locomotion generally go together. The mechanism of locomotion consists of sensory nerves, a co-ordinating centre, and motor system of nerves, by which the co-ordinating centre is brought into contact with the muscles of the trunk and limb. In the maintenance of equilibrium the upper limbs have no pure locomotive purposes, yet they are co-ordinated with the lower limbs, and we find the right hand swinging with the left foot. In disease (locomotor ataxy) the tactile and visual impressions have great influence in the co-ordination of locomotion, and,

Efferent  
apparatus.

except for the purpose of locomotion, the motor power is unimpaired.

Functions of  
corpora quad-  
rigemina.

*Functions of the optic lobes or corpora quadrigemina.*—They are *centres of co-ordination* between retinal impressions and movements of the iris. When both optic lobes are destroyed vision is abolished, and the pupils cease to contract under the influence of light. This shows that there is connection between the optic tract and oculo-motor nerve which supplies the circular muscle of the iris. The central nucleus of the motor oculi is situated in the corpora quadrigemina beneath the aqueduct of Sylvius. Where one optic lobe is divided blindness of the opposite eye results. The destruction of one optic tract often causes bilateral contraction of the pupils. The blindness of the opposite eye is accounted for by the decussation of the optic tracts in the optic commissure, but it must be remembered that the decussation is not complete, for each nerve tract supplies corresponding parts of both retinae, *i. e.* the right half supplies the outer half of the right eye and inner half of the left, that in the anterior angle of the commissure, the fibres pass directly from one retina to the other, and in the posterior angle fibres connect both centres together. This accounts readily for a single vision in both eyes.

In injury to the optic lobe, besides complete blindness, there is derangement of *equilibrium* and of *locomotive co-ordination*, and paralysis of oculo-motor nerves. The optic lobes are concerned in a reflex expression of feeling or emotion. Slight irritation or *excitation* of optic ganglia produces convulsive movements and contraction of the pupils. The corpora are also very sensitive to the action of *electricity*, and very *complex movements* of the head, trunk, limbs, and facial muscles, are the result. These movements are due to the conduction of the current to the underlying motor tracts. The phenomena of electric irritation are mainly of

a reflex character, and depend on the transference of irritation from sensory to motor centres. The optic lobes are similar in construction to the spinal cord, and the optic tracts are therefore homologous to the posterior roots of a spinal nerve. Thus the movements of the *trunk and limbs* are concerned in the maintenance of equilibrium and locomotive co-ordination. A momentary irritation of the lobes excites a reaction resembling *backward start*, this is known in the sudden approximation of an object to the eye. Thus we have optic impression co-ordinated with muscular action, and the result is to withdraw the head and eyes.

Powerful general stimulus to the corpora quadrigemina leads to *Trismus* and other facial contractions. These painful expressions of sensory nerves are due to the structural connection of one of the sensory roots of the fifth nerve with the optic lobes.

Another indication of painful expressions is *the dilatation of the pupils*. This is produced through the medium of the sympathetic nerves which dilate the fibres of the iris. Another effect is the *excitation of cries*. As a frequent concomitant of feeling or emotion we also find alterations in the functions of *circulation and respiration*. Experiments show that electric irritation of the interior of the corpora quadrigemina causes a great rise in the blood pressure, and the heart acts slowly. The respiration is affected, the inspiration is deep, and followed by powerful and prolonged expiratory efforts. The irritation of the corpora has also a direct influence on the *viscera*, causing contraction of the stomach, intestines, and bladder. Thus, under sudden emotions a sudden expulsion of urine or *fæces* occurs.

*Functions of the cerebellum.*—These vary as the disease excites or destroys the centre, according as it is abrupt or of slow growth, or according as the cerebellum is

Functions of  
cerebellum.



directly affected, and to a limited extent, or indirectly, and affections of other nervous centres are superadded.

Locomotive  
co-ordina-  
tion.

Its functions, however complex and adaptive, do not include intelligence or volition. The cerebellum is an organ of locomotive co-ordination. Its disease causes disturbance of stability and locomotion, as manifested in a reeling and uncertain gait, like that of a drunken man. Cerebellum forms an essential part in the central mechanism by which external impressions are co-ordinated to responsive actions. Injury (chemical or otherwise) to the cerebellum, apart from injury to neighbouring structures, causes disorder of movements resembling those of intoxication. In slight cases, where the lesion may be superficial there are no marked effects on co-ordination; very often the co-ordination of movements may be retained, and the patient may only reel and totter.

When the anterior part of the middle lobe of the cerebellum is injured, the tendency is to fall forwards, and on attempting to walk the patient tumbles on his face. In injury to the posterior part of the median lobe the head is drawn backwards and there is tendency to fall backwards. In injury to other parts of the cerebellum the rotation is towards the side injured. In connection with this disturbance of equilibrium, temporary or *permanent oscillation* of the eyeballs or *Nystagmus* occurs.

Electrization.

*Electrization of the Cerebellum.* — When a galvanic current is passed through the head by placing the poles of the battery in the fossa, just behind the ears, the patient experiences vertigo or the external objects alter their relations to him. When the positive pole is placed in the right mastoid fossa and the negative in the left, so that the current passes from the right to the left, the head and body sink towards the positive pole and the external objects whirl to the other. When the eyes are closed the individual feels as if he were entirely whirled from right to left.

At the moment the head moves towards the positive pole the eyeballs also move in the same direction and oscillate. Besides these effects there occur certain *modifications of consciousness* owing to the other structures (hemispheres) being involved. We know that injury or destruction of the hemisphere at once destroys consciousness and the will, but does not affect equilibrium, shows that cerebellum is the agent of co-ordination of sensory impressions with special motor activity. We know from experiments that if the right eye is fixed on some object and the inner side of the eyeball is pressed on, the object seems to move to the left, and if the eyeball be moved to the left the object will move to the right, and it will move upwards or downwards if the ball be pressed downwards or upwards. Again, if the body be whirled from right to left the external objects will appear to revolve from left to right, and will continue to revolve for some time, even if rotation ceases. This is owing to the persistence of retinal impressions. As a result, a feeling of giddiness comes on and as a compensatory action there is inclination of the head and body to the right side, and of the eyes to the right also.

The cerebellum has a complex arrangement, and with other centres regulates the movements necessary to maintain equilibrium of the body. During health any tendency to the displacement of equilibrium calls into play compensatory action. Every form of muscular exertion tends to overthrow this balance, and the cerebellum is proportionately developed to meet the compensation. Blindness was supposed to be a result of cerebellar disease, but the impression is erroneous, it is due to a tumour within the cranium pressing upon and obstructing the return of blood from the retina. In the same way priapism, which occurs in cases of hæmorrhage into the cerebellum, is not due to the irritation of the cerebellum, but of the subjacent posterior surface of the medulla and pons.

Functions of  
the cerebrum.

*Functions of the cerebrum.*—These are sensation, ideation, volition, and intelligence. By it we think and will. The localisation of cerebral functions is yet a mystery. The frequent coincidence of aphasia with softening of the posterior part of the left third frontal convolutions, and the unilateral and localised epileptiform convulsions throw some light on the physiology of some parts of the cerebrum. The relationship between the convolutions and the central ganglia (corpus striatum) shows that the disease of the right convolutions lead to convulsions on the opposite side.

The cerebral hemispheres give no reaction to the application of mechanical or chemical irritation. In injury to the cerebrum no manifestation of pain is noticed. The electric stimulus to the posterior parietal lobule causes the advance of the opposite lower limb (as in walking), the action being limited to foot and ankle, the foot being flexed on the ankle and the toe spread out. The irritation of the anterior portion of the brain leads to voluntary movements.

Each hemisphere is divided into different lobes. Commencing above and running downwards and forwards is the great central fissure of Rolando, which divides the frontal from the parietal lobe. The frontal lobe lies under the frontal bone. In front of the fissure of Rolando is the anterior frontal convolution. Proceeding forwards and along the margin of the hemispheres is the superior frontal convolution. Below this is the middle frontal convolution, and below it is the third or inferior convolution. The inferior convolution forms the superior boundary of the front of the fissure of Sylvius. This convolution is anatomically known as Broca's convolution, and in which is said to reside the speech.

Perceptive  
centres.

*Perceptive centres.*—It has been found from experiments that perceptive centres of the senses are situated in a limited area within the convolutions. Thus, the destruction of the temporo-sphenoidal lobe causes deafness, and it is

regarded as *auditory centre*. Destruction of the hippocampal region impairs sense of touch or common sensation, and this is called the *tactile centre*. The lower part of temporo-sphenoidal lobe contains centres of smell and taste.

*Sensory centres.*—The posterior parts of the hemispheres are the seat of sensory impressions. These are the posterior and the anterior. The posterior impressions are receptive and the anterior active. Thus, in ordinary contemplation the posterior lobes, and in active thought, as in writing and speaking, the anterior lobes are at work.

The parietal lobe extends from the fissure of Rolando to the parieto-occipital fissure. The angular gyrus is a convolution of the parietal lobe, and bends round the upper extremity of the fissure of Sylvius. It is regarded as a *visual centre*. The effects of lesion are movements of the eyeballs, and frequently movements of the head to the opposite side, and very often contraction of the pupils, and impairment of sight. When the lesion is circumscribed there is only loss of vision, other senses remaining unaffected. The irritation causes no motor paralysis; hence the movements of the eyeballs and of the head under electricity are merely reflex indications of sensory stimulation. The destruction of one angular gyrus causes complete blindness in the opposite eye, shows decisively the cross-action of the hemispheres with respect to vision. This fact is borne out by the total decussation of the optic nerves in the optic chiasma. The lesion of the chiasma causes hemiopia or partial blindness in both eyes, the lesion of the visual centre in the hemisphere causes complete unilateral blindness in the opposite eye. In the chiasma some fibres cross to the opposite eye, others pass to the eye of the same side; the latter lie externally, the former occupy the central place, in the optic tracts. Each optic tract contains external fibres for the same eye, and internal for the opposite eye; hence lesion of the left optic

Sensory  
centres.



tract will cause hemiopia of both eyes. The external fibres which do not decussate in the chiasma decussate in the corpora quadrigemina, and so reach the opposite hemisphere. The other fibres which decussate into the chiasma pass directly through corpora geniculata into the hemispheres. Thus all the fibres of the right eye reach the left hemisphere and *vice versa*. From this it may be gathered that after destruction of visual centre of one eye, sight with both eyes is still possible by a process of compensation. Such compensatory relation is found in cases of unilateral lesion of the grey matter.

Auditory  
centre.

*Auditory centre.*—The irritation of superior temporo-sphenoidal convolution leads to sudden retraction or pricking up of the opposite ear, wide opening of the eyes, dilated pupils, and turning the head and eyes to the opposite side.

Tactile  
centre.

*Tactile centre.*—Destruction of the hippocampus major abolishes tactile sensation on the opposite side of the body. The irritation of this region would cause similar effects as irritation of centres of sight or hearing.

Experiments show that division of the *sensory branch of the fifth* causes paralysis of the facial muscles resembling motor paralysis. The true centre of tactile sensation is the cortex cerebri as distinct from the pons. The disorganisation of that portion of the crus cerebri which lies external to the optic thalamus causes hemi-anæsthesia of the opposite side of the body. Anæsthesia resulting from this lesion is due to interruption of centripetal fibres which proceed to the hippocampal region. In this affection there is loss of tactile sensation on movement and also of the consciousness of muscular contraction. The first effect of the loss of tactile sensation is to cause cessation of voluntary movements, yet the power of movement remains under the guidance of the eye. Remove the agency of the eye and the limb falls to the ground unconsciously.

*Sense of smell and taste.*—A blow on the head will cause loss of smell and taste, and may be due to injury by counter stroke to lesion of the lower part of the temporo-sphenoidal lobe, where the centres of taste and smell are located. Sense of  
smell and  
taste.

*Motor centres.*—The destruction of the cortical substance of the motor centres causes paralysis of movements. In this the power of motion alone is destroyed, sensation remaining unimpaired. In softening of the cortex of the hemisphere involving motor tracts permanent hemiplegia was the result in a few cases; in others recovery followed. Where recovery has been effected it may be due to a process of compensation by the cortical centre in the other hemisphere. This is best illustrated in the paralytic patient: if told to raise the paralysed limb he is utterly unable to do so, but if asked to raise the sound leg and then to raise the paralysed leg, a slight movement may be observed, and if these efforts be persisted in the paralysed limb will move considerably. In cases of disorganisation of both motor centres in both hemispheres there is still left a power of spontaneous movements of the limb. There are muscular efforts which accompany muscular contractions, but are independent of them. In case of paralysis patients express themselves as conscious of putting forth great energy to move the limb. Thus, in paresis the effort is attended with slight movement, as if attended with a heavy weight, although no weight is actually raised. In hemiplegia, if the patient is told to close the paralysed fist, he unconsciously closes the sound one. In this, although the action is not as desired, still consciousness of effort exists. This effort is dependent on centripetal impressions generated by the act of contraction, and when the paths of centripetal impressions are destroyed, muscular effort is lost. Thus, in cases of tetanus the irritation of a nerve by faradization causes the lost fingers to seem to be flexed. In this case Motor  
centres.

there was excitation by the electric stimulus of the sensory nerves, and this caused the movement.

Thus, the destruction of centripetal centres abolishes muscular sense, though the power of movement remains. The destruction of centrifugal centres abolishes power of voluntary motion, but the transmission of centripetal impressions continues unimpaired. Muscular discrimination of weights by the fingers can be best determined by the patient being blindfolded, and weight discriminated by the hand being laid flat on a cushion, and afterwards, when the wrist was flexed, to raise the same weight with the fingers.

Cutaneous  
Pressure.

*Cutaneous pressure.*—Similar experiments by electricity applied to the flexors will test the sense of cutaneous pressure.

In *ataxy*, notwithstanding the abolition of cutaneous sensibility, the patients are said to retain muscular discrimination, but such patients are not able to discriminate light weights. In them the muscular discrimination of heavy weights causes general sense of effort, which belongs to the respiratory muscles, attended with bodily strain necessary to support a heavy weight.

Functions of  
ganglia at  
base of brain.

*Functions of the ganglia at the base of the brain.*—These are corpora striata and optic thalami. Both connect the cortex with the crura cerebri, and through these with the periphery.

Corpora  
striata.

*Corpora striata.*—The corpus striatum cluster round the peduncular expansion in two masses; one projects into the cavity of the lateral ventricle, and is called nucleus caudatus or intra-ventricular nucleus, the other is in proximity to the isle of Reil, and is called lenticular ganglion or extra-ventricular nucleus. It is purely a motor centre. Destruction of the ganglion produces hemiplegia of the opposite side, sensation remaining intact. We know that paralysis of voluntary motion may result from lesion of the cortex and medulla apart from injury to the basal ganglia. In basal paralysis there is

powerlessness and flaccidity of muscles of the opposite side, paralysis affects most those movements which are complex and independent, and there is destruction of a limited lesion, whereas in the cortex the destruction is extensive ; hence hemiplegia from lesion of cortex is very rare.

*Optic thalami.*—The optic thalamus is a sensory tract, and related to the sensory tract of the crus cerebri. The medullary fibres which converge from the optic thalamus are distributed to the posterior and temporo-sphenoidal regions of the hemisphere. Paralysis of motion is found to coexist in lesion of the optic thalamus, with or without diminution or loss of sensation. Electricity to optic thalamus causes no movements, showing that it is not a ganglion of motor functions. A complete destruction of this sensory part must take place before sensation is abolished. Optic thalami.

This general account of the anatomy and physiology of the nervous system has been written after a careful review of recent investigations, and particularly of those of Dr. Ferrier in his treatise ‘On the Functions of the Brain.’

*Sympathetic system.*—The sympathetic system of nerves are chiefly seated in the medulla oblongata, and their nuclei are also intimately interwoven with the cord. The sympathetic system presides over the movements of involuntary or organic muscular fibres. It also determines the dilatation and contraction of blood-vessels, and therefore the amount of blood supplied to various parts, and also the rapidity of its flow through them ; it thus regulates their nutrition, functions, and their temperature. Some of the special branches of the sympathetic affect secreting gland structures. Anatomically the sympathetic system is connected with the brain and cord. Functions of sympathetic system.

*The arteries of the brain.*—The meningeal arteries are distributed to the dura mater, and are derived from branches of the external carotids. Other arteries are derived from the common carotids and the vertebral, and Arteries of the brain.



they together form the circle of Willis. The *middle cerebral* artery divides in the fissure of Sylvius into four branches. The anterior or the *first* branch ramifies only over the third frontal convolution, the *second* over the second frontal convolution and over the whole of ascending frontal, the *third* supplies to the ascending and to the parietal, and the *fourth* to the first and second temporal convolutions. The arteries supplied to the ganglia at the base of the brain are the *three pairs* of cerebral arteries. The *anterior* pair is supplied to the anterior extremity of the corpus striatum, the *middle* pair to the major portion of the corpus striatum, to the whole of the caudate nucleus, and the anterior and outer part of the optic thalamus. The *posterior* to the choroid plexuses and corpora quadrigemina. It is necessary to bear in mind that in cerebral circulation there is little or no communication between the branches of the cerebral vessels except at the circle of Willis, and hence if any artery becomes obstructed the region which it may supply must suffer throughout. The arteries supplying the grey matter are distinct and short, those of the white are long.

Veins.

*Veins.*—Those distributed on the surface of the brain open into various sinuses. The cerebellar and the cerebral veins converge into lateral sinuses, and all blood is returned to these parts by the internal jugular veins. The longitudinal sinus communicates with the veins on the exterior of the skull through the parietal foramen, and lateral sinuses into those of the head through the mastoid foramen.

The nervous system requires a certain amount of repose and also a due supply of pure blood for its nutrition and its function. The venous blood, or that poisoned by bile or urea, will thus interfere with the intellect and the motor powers. When the blood is over oxygenated or when sent to the brain in too large a quantity, it leads to increased mental and motor functions, it causes undue waste

of tissues, and leads to a diminished supply of blood to the body, and thus results in rapid exhaustion. The waste is manifested in the urine which contains increased quantity of urea, chlorides, and phosphates.

In treating of diseases of the brain I have first described affections of its coverings, next of its substance, and lastly of its functions. Disease of the cord and peripheral nerves I have treated on the same method.

### MENINGITIS.

The term arachnitis is also used for inflammation of the membranes of the brain. It implies cases where exudation proceeds from the arachnoid cavity. In meningitis the inflammatory product is found in the meshes of the pia mater or is subarachnoidal. Arachnitis is an inflammation similar to inflammation of other serous membranes, and its source of secretion is the dura mater. Meningitis may be simple or tubercular.

### SIMPLE OR PRIMARY MENINGITIS.

*Simple or primary meningitis* is an inflammation of the membranes of the brain. In this, as in other forms of meningitis, the ventricles are usually involved in the inflammation. The pia mater and the arachnoid are chiefly affected, though the dura mater seldom becomes inflamed, save from blows or wounds.

*Causes. Predisposing.*—It is most frequent among adult males; in those whose constitution has been debilitated from previous illness, syphilis, rheumatism, or tubercles; in persons who reside in hot climates or in hot season; in those who indulge in various excesses, such as over mental work, and who suffer from loss of sleep, and from Bright's disease. *Exciting.*—Direct injury to the

membranes; extension of inflammation as from diseases of the bones of the nose or of the ear; erysipelas of the head or face; irritation from adventitious growths; syphilitic affections of the bones of the skull.

Post-mortem  
appearances.

*Post-mortem appearances.*—When the inflammation extends from the bones of the skull to the *dura mater* the membrane is thick, soft, and loosened from the bone. Sometimes it is adherent to the surface of the bone by shreds; frequently suppuration takes place between the *dura mater* and the skull, and often pus escapes into the arachnoid cavity. When meningitis is due to disease of the temporal bone the sinuses of the brain become involved, and thrombosis or pyæmia results. The inflammation may involve the membranes extensively or may be localised. The *arachnoid* is dry, parchment-like, and opaque; there is scarcely any exudation, the lymph being for the most part beneath the arachnoid and in the *pia mater*. The *pia mater* is also red and highly vascular and opaque, and covered with patches of extravasation. In the early stage we find in the meshes of the *pia mater* and in the sac of the arachnoid, serum which may be clear or turbid and flocculent, or sometimes blood-stained. Frequently there may be found an opaque exudation more or less purulent, covering the surface of the brain, or the sulci between the convolutions. In long continued cases the superficial layer of the grey matter of the brain is found to be red, soft, and often adherent to the *pia mater*. In some cases even the ventricles contain an excess of serum or pus, or their walls are covered with exudations.

Symptoms.

*Symptoms.*—Acute inflammation of the *dura mater* is almost always due to chronic otitis interna; the patient may have for years suffered from deafness of one ear and more or less copious and offensive discharge, and also from pain, and by sudden or undue exposure to cold, or by a blow to the affected ear, or without any cause, meningitis

occurs. In many cases with the inflammation the discharge from the ear ceases. At first the patient complains of severe pain in the diseased ear or of headache, or of vomiting and rigor, this is soon followed by fever. There is an early and violent delirium, contracted pupils, great irritability of temper and intolerance of light and sound, the tongue is coated, the face is flushed, there is hard pulse, with twitchings of muscles, sometimes there are convulsions or prostration, followed by drowsiness or coma, or the delirium soon merges into collapse. All these symptoms are not necessarily present in the same case. Sometimes the disease may set in with convulsions or with vomiting, or sometimes with a rigor. The patient in acute cases dies in two or three days, but life may be prolonged for months. When the disease has become established the symptoms are those of the *first* or *stage of excitement*, viz. intense and constant headache, increased on least movement; great heat of the head; flushed face; injected conjunctivæ; violent irritability of temper, wild and active delirium; increased muscular actions; and increased or perverted sensibility; as tingling or formication; great restlessness; twitchings of muscles; and even convulsions; the eyeballs are fixed or move convulsively, and the pupils are contracted. With these symptoms there are high fever, frequent hard pulse, great thirst, white and furred tongue, cerebral vomiting, constipation, irregular and moaning breathing. After suffering from these indefinite symptoms, the patient passes into the *second stage*, that of *collapse*. There is more or less failure of the cerebral functions, the headache and fever altogether subside, and delirium is followed by profound sleep and muttering stupor, ending in coma. There are also subsultus tendinum, twitchings of muscles, or convulsions or paralysis. The pupils are dilated and motionless; the head is hot, but the body below the normal heat; the pulse is slow and inter-



mittent; the tongue dry and brown; the respiration irregular and sighing, and the urine is retained. Sometimes the patient suffers from convulsions, followed by paralysis and coma; sometimes paralysis of the muscles of one of the eyeballs, or of speech or deglutition, are the main features. Very often he passes into the *third stage*. In this condition there is complete abolition of the cerebral functions, absolute coma, stertorous breathing, involuntary passage of urine and fæces, ending in extreme depression, and ultimately death.

Treatment.

*Treatment.*—Find out the source of mischief, and if practicable remove it. In the early stage keep the patient at perfect rest, in a comfortable bed, in a cool well ventilated room, with the head slightly raised. Close the room to all except the nurse, loosen the clothes about the neck and chest, shave the head, and keep up constant application of ice; if the subject be plethoric apply a few leeches to the temples. The bowels should be freely acted on by drastic purgatives; the increased general vascular excitement may be relieved by salines and vascular depressants, as aconite, veratria, arnica, digitalis; calomel should be given every two hours till salivation is produced, or bromide of potassium alternated with iodide or both combined. The diet should be liquid but nourishing, and frequently repeated. Should convulsions occur they must be treated by bromide of potassium. Vomiting can only be checked by counter-irritation to the nape of the neck. In the state of extreme prostration administer stimulants and nourishing food, either through the mouth or by means of enemata.

Hæmorrhage  
from cerebral  
membranes.

#### HÆMORRHAGES OF CEREBRAL MEMBRANES.

Hæmatoma.  
Definition.

*Hæmatoma.*—As traumatic it is rare. All other hæmorrhages within the cerebral hemispheres are consequent upon rupture of the blood-vessels. This is known as hæmatoma

of the dura mater. The affection is not a simple extravasation, at whose periphery the fibrin has been precipitated and the fluid part capsulated, but it is due to chronic inflammation of the dura mater with hæmorrhagic exudations. The blood filling the sac comes from numerous thick-walled capillaries that have formed in the pseudomembrane of the dura mater, and it has been then effused into the layers of the dura mater.

*Causes.*—These are unknown. The disease occurs chiefly in old age, with degeneration of the arteries, and in drunkards. In some cases it develops from injury of the brow. Causes.

*Anatomical appearances.*—If the arachnoid be not torn, the extravasation will not wash off. Usually the part of the extravasation reaches the ventricles, and we find more or less blood in them. Hæmatoma is generally found near the sagittal sutures, as a flat oval sac about four or five inches in length, two to three inches broad, and about half an inch thick. Its walls are rusty brown from its containing altered hæmatin. It partly contains fluid blood and partly coagulated clots. The corresponding half of the cerebrum is flattened or even depressed; very often there may be depression on both sides. Anatomical appearances.

*Symptoms* are the same as those of hæmorrhages generally. Even if uncomplicated with cerebral hæmorrhage it often leads to an apoplectic fit, which may cause death right off, but in this disease there is no hemiplegia. Hæmatoma often runs through many brain symptoms, and of these contraction of the pupils is a constant sign. Symptoms.

*Treatment.*—If the disease be diagnosed during life constant application of ice to the head and a purge occasionally are beneficial. Treatment.

TUBERCULAR MENINGITIS. ACUTE HYDROCEPHALUS. Tubercular meningitis.

This form of inflammation is also called basilar menin-

gitis, is most common in scrofulous children, or after an acute disease in children over one and under seven years of age. A large proportion of cases occur after whooping-cough and measles. It is rare in adults, and most often occurs in them as a part of general tuberculosis. In this inflammation there is a deposit of grey tubercular granulations at the base of the brain, along the course of middle meningeal artery, and occasionally all over the brain surface. The walls of the ventricles are distended with serum, hence the affection is also termed *acute hydrocephalus*.

Causes.

*Causes.*—A supposed source of infection, such as a caseous bronchial gland, usually exists.

Post-mortem  
appearances.

*Post-mortem appearance.*—Tubercular meningitis is usually accompanied by miliary tubercles in other organs. The hemispheres exhibit no evidence of exudation, the surface is greasy to the feel, and the sulci are found to contain streaks of lymph. The convolutions are flattened from exudation of fluid within the ventricles. The tubercles are chiefly seated at the base of the brain, and the disease is generally most marked there, a fluid exudation is found at the base of the brain covering the optic commissure and the subarachnoid space, and extends forwards into the Sylvian and longitudinal fissures, and backwards upon the pons and crura cerebri and cerebella. The membranes in these parts are dotted with minute granules, which are either opaque or translucent. The tubercles are seated in the lymphatic sheaths of the blood-vessels. The ventricles of the brain are distended with fluid (which is usually slightly turbid), their walls are softened by maceration, and the foramen of Monro is dilated.

Symptoms.

*Symptoms.*—The premonitory stage, as it occurs in children, varies in duration from a week to two months. The patient is usually ill-nourished or even emaciated, but cases also occur in well-nourished children. It is generally believed the tubercles are present, and certainly in

the lung. At first there is general constitutional disturbance, showing the onset of a severe malady. The disease sets in with headache, and in some cases obstinate vomiting. The patient has a short, dry cough, becomes peevish and irritable, forsakes its play, complains of intense headache, is giddy, screams, and grinds its teeth, and starts from sleep as if alarmed, without any apparent cause. It often suffers from fever; the temperature ranging from  $100^{\circ}$  to  $103^{\circ}$ . When the disease is established there are symptoms which indicate disturbance of the brain, and the patient either lies very still or is very restless, the tongue is furred, the breath offensive, the urine scanty, deficient in chlorides, containing urea and abundance of phosphates, and there is nausea with cerebral vomiting, the bowels are constipated. The progress of the disease exhibits three stages. During the first or *stage of invasion* there are high temperature, and phenomena of nervous irritation. In the *second stage* there is diminution or cessation of fever, the pulse is slow, and instead of nervous irritability we have commencing paralysis. In few cases there is hemiplegia, which deserves notice, as it may lead to error in diagnosis. In the *third stage* the cerebral functions are abolished, and there is coma or convulsions combined. In the *first stage* the patient likes to be let alone, and feels irritated by light or by the least noise. The countenance is expressive of anxiety and suffering, is alternately flushed and pale; the eyes are closed, the eyebrows knit, and the pupils contracted. The child complains of headache and sleepiness, and utters a piercing shriek called the hydrocephalitic cry. The pulse is slow, respirations irregular and sighing, temperature normal or below it, abdomen hollow, bowels constipated, and tache cerebrale well marked. (Tache cerebrale is a vivid red mark elicited by drawing the back of the nail sharply along the skin of the abdomen.) The child has a strong

Three stages.

First stage.



Second stage.

tendency to sleep, the pain in the head and other symptoms subside for a time, or there is remission, when the patient looks somewhat improved, but this is not followed by any continued improvement. The *second stage* now sets in, and gradually stupor and heaviness come on, the pupils become dilated and sluggish, the patient lies on his back in a state of insensibility, occasionally crying out, picking with tremulous fingers his nose and lips, and lies with his eyes half closed, and never asking for food. There is involuntary passage of urine and fæces, or the urine is retained in the bladder, which becomes distended. Diarrhoea sets in, and the fever diminishes with cold sweats. Some paralysis frequently occurs, especially ptosis. Very often this

Third stage.

merges into the *third stage of coma* or of coma and convulsions combined. The cerebral functions are abolished. The drowsiness, from which the patient could before be roused, though with difficulty, now passes into profound coma. The child does not respond at all to external influences. The pulse is extremely feeble, and the extremities cold, or violent convulsions or paralysis supervene, with squinting and dilated pupils, the eyes are dull and heavy and insensible to light. The patient rolls his head, has subsultus or tremors, picks at bedclothes, and occasionally utters shrieks or cries; the pulse is now extremely rapid and feeble, the trunk is hot, and extremities cold and surface dusky; the sphincters also relax. Death occurs from coma or from convulsions. It has often been noticed that patients towards the beginning of the third stage wake up as if recovering, but such amendments are delusive, and in a day or two all the symptoms recur with increased severity.

Pathogno-  
monic  
symptoms.

*Pathognomonic symptoms.*—1st stage. The child is fretful, is wasting, has loss of appetite, and constipation. 2nd stage. Fever, but temperature is not very high, tongue

not much furred, there is headache, delirium, a peculiar cry, restlessness, contracted pupils, squinting, irregular respiration, flushed face, and tache cerebrale. 3rd stage. Insensibility, dilated pupils, grinding of teeth, convulsions, slow pulse, cold skin, and paralysis.

In this disease, the surface of the brain being involved, there may be delirium at first, gradually torpor, and ending in coma. Also there may be convulsions or spasmodic contraction of muscles. Where the ventricles are distended with fluid there is profound coma, and owing to softening of the ganglia on either side there may be hemiplegia. The implication of the cerebral nerves leads to strabismus, inequality of pupils; that of the pneumogastric to irregular respiration, to slow action of the heart, and disordered stomach.

*Duration.*—The disease lasts from five to twenty-five days. The symptoms vary considerably. In some cases there may be only coma or drowsiness, and collapse a day or two previous to death, the patient having previously been ill with inflammatory affections, or the only symptoms may be cerebral vomiting without any cause, retraction of the head, fever, peculiar condition of pupils, paralysis and characteristic cry. *Duration.*

When tubercular meningitis occurs in adults there may previously have been some lung affection present (pulmonary tubercles), which may seem to have subsided for a time. In them meningitis sets in with convulsions or apoplexy, or with cerebral vomiting, and fever, and pain in the head. The patient likes to be left alone, is peevish and irritable, has a feeble and irregular pulse. This is soon followed by mental depression, delirium, tonic or clonic spasms; stupor increases, followed by paralysis and death. *Tubercular meningitis in adults.*

*Diagnosis.*—Tubercular meningitis has been known to occur with such unexplained suddenness, and in several members of the same family with so little interval, as to *Diagnosis.*

raise suspicion of death due to poisoning. Simple infantile convulsions often look very like cases of tubercular meningitis, a short delay in diagnosis will settle the question. The presence of squint will distinguish tubercular meningitis from mere delirium. In an adult, tubercular meningitis giving rise to hemiplegia has been mistaken for a cerebral tumour, and on the other hand hemiplegia due to cerebral hæmorrhage, caused by violent coughing in whooping-cough, has caused the case to be mistaken for one of tubercular meningitis. No definite rules can be laid down for the distinction of cases of so much difficulty, and where no accurate history is obtainable it is best to suspend a conclusion for a time.

Treatment.

*Treatment.*—As tubercular meningitis is invariably fatal, the treatment should be confined to such points as would be useful, if the case were not what it is. The bowels may be opened by an enema or by castor oil, the patient must be fed, and is most comfortable in a quiet room from which bright light is excluded.

### RHEUMATIC MENINGITIS.

Rheumatic meningitis.

*Rheumatic meningitis* sets in during the progress of acute rheumatism, and is characterised by great elevation of temperature, even  $110^{\circ}$  not being very rare. It comes on suddenly, and is accompanied by delirium, and is almost always fatal.

Cause.

*Cause.*—It is due to metastasis of rheumatism from the joints to the brain. Some believe it may sometimes be produced by the large doses of quinine given to check rheumatic fever.

Post-mortem appearances.

*Post-mortem appearances.*—The membranes are congested; there is serum or pus in the subarachnoid space and over the surface of the hemispheres.

For details see acute rheumatism.

## CEREBRO-SPINAL MENINGITIS. (CEREBRO-SPINAL FEVER.)

*Cerebro-spinal meningitis* is an epidemic disease, in general course resembling a specific fever, and probably produced by the same kind of cause. It consists of an inflammation of the membranes, and sometimes of the substance of the brain and spinal cord. It is characterised by a peculiar petechial eruption of a purpuric character, attended with collapse, and early terminating in death. The inflammation always involves the pia mater and the arachnoid. The dura mater, as in all forms of meningitis not due to injury, is rarely affected.

Cerebro-spinal meningitis.  
Definition.

*Causes.*—The disease attacks young persons between fifteen and thirty, and males more than females; and is common during the winter, and where numbers of people are crowded together. It is often produced by contagion.

Causes.

*Morbid Anatomy.*—The rigor mortis lasts for a long time. There is also extensive post-mortem congestion of the most dependent parts. On opening the skull blood escapes. The dura mater is tense, opaque, and here and there covered with hæmorrhagic deposits. The arachnoid cavity contains sero-purulent exudation. The exudation is also found in the fissure of Sylvius, at the base of the cerebellum, and in the cerebrum. The brain is soft and pulpy, and chiefly in the neighbourhood of the ventricles. The ventricles also contain some pus. *Spine*—The dura mater is tense and vascular. There is purulent fluid between it and the arachnoid. The arachnoid is also opaque. The pia mater is infiltrated with sero-purulent exudation. The muscles are dark, and the body is covered with scattered vesicles (Herpes) which are dry.

Morbid anatomy.

*Symptoms.*—The symptoms are similar to those of tubercular meningitis already described; they may be ushered in by chilliness or actual shiverings, by giddiness, by very

Symptoms.



severe headache, by nausea, and by irrepressible vomiting. In a short time delirium follows, ending in coma, or tetanic spasms and convulsions occur. Where coma does not occur, the whole body feels over-sensitive. There are sharp spasmodic pains and stiffness of the muscles of the back of the neck; with sensitiveness of the spine and limbs, and there may be loss of sight and of hearing. As the case progresses the headache becomes more severe, the neuralgic pain and tenderness in the head make the patient cry out suddenly from time to time. The skin of the body is of abnormally low temperature, and is sometimes dry, sometimes moist. Petechial eruption appears on the neck, breast, or limbs, or erythema, or roseola, or herpes appear on the lips. The face soon becomes pinched, anxious, and distressed; the pulse is frequent and feeble, and the temperature seldom or never rises above  $105^{\circ}$ , and in those cases in which collapse occurs it often falls below the normal; the head is drawn backwards by the arching of the neck and is fixed rigidly; deglutition is difficult, and spasmodic convulsions often occur. The respirations in severe cases become embarrassed, hurried, or shallow. Delirium, which may set in late or early, is wild and maniacal; the eyes are bloodshot, and the pupils are irregular and contracted; the tongue is clean or brown and dry, the teeth and gums are covered with sordes. Severe gastralgia is not uncommon. Violent sickness occurs during the early period, often coming without nausea and without provocation from food. The urine contains albumen and blood. The bowels are irregular.

Termina-  
tions.

*Terminations.*—Recovery is very rare, and when it occurs it is extremely slow. In unfavorable cases the patient soon becomes unconscious, and falls into a heavy stupor, there is loss of power over the limbs, tremulousness, imperfect vision, and involuntary discharges. The respiration also gets embarrassed, and prostration becomes

extreme. Death may occur within a few hours, or after some days. Relapses are very common. The first four days are most dangerous.

*Sequelæ.*—Are due to some irritation of the nerves at the seat from whence they emerge. These sequelæ are inflammation of the cornea, or of the internal ear, inflammation and suppuration of the large joints, and bed sores. Sequelæ.

*Prognosis.*—Very unfavorable. Life is rarely prolonged beyond the fourth day. Prognosis.

*Treatment.*—The disease is characterised by asthenia, and, therefore, bleeding, purgatives, and calomel always do harm. Ice is good for the headache, for vomiting hypodermic injection of morphia and of atropine to the neck sometimes gives rise to hopes of recovery. Quinine internally has succeeded in many of these cases. The urgent symptoms may be treated on general principles. Food should be nutritious and liquid, and stimulants should be avoided or used with caution. If nothing can be retained by the mouth, nutrient enemata may be tried. Ergot and bromide of potassium are used to relieve cerebral congestion. Opium should be used with great caution. Treatment.

#### MENINGITIS FROM LOCAL CAUSES.

Meningitis  
from local  
causes.

Meningitis exhibiting the general symptoms of cerebral irritation is often produced by local causes. These sometimes require surgical aid, but in other cases are due to little suspected lesions.

*Causes.*—Blows on the head without fracture often give rise to a patch of meningitis; the same result is produced by exposure to the sun's rays, and this is quite distinct from true sunstroke. But the commonest local cause of meningitis is abscess of the internal ear, such as follows scarlet fever. Causes.

Morbid  
anatomy.

*Morbid Anatomy.*—In death from meningitis due to otitis interna, a small necrosis of the petrous portion of the temporal bone is usually found ; near it there is a circumscribed collection of lymph, and in some cases lymph is found all over the base of the brain. Metastatic abscesses of the lung are frequently found in such cases.

Symptoms.

*Symptoms.*—A sudden violent ear-ache after scarlet fever ought always to arouse suspicion of abscess of the internal ear, and is often the only symptom preceding the condition of stupor. In its general course this form of meningitis is not easily distinguished from the others which have been described.

Prognosis.

*Prognosis* is unfavorable, but a few cases of recovery are recorded.

Treatment.

*Treatment.*—As a preventive it is most important to see that all discharges from the ear have free exit. The external ear should never be stuffed with cotton wool.

Congestion  
of brain.

### CONGESTION AND ANÆMIA OF THE BRAIN.

Definition.

It is often associated with congestion of the membranes of the brain, and with cerebral hæmorrhages. The disease occurs in two forms—mild and severe. The mild form is popularly known as the brain fever: The severe form is called congestive apoplexy, and it induces perversion or abolition of cerebral functions, such as headache, giddiness, delirium, or convulsions.

Causes.

*Causes.*—General plethora and all those conditions which lead to increased flow of blood into the brain: as in chorea, epilepsy, tetanus, and mania; chronic bronchitis, whooping-cough; violent muscular efforts; heart disease; weakness of the coats of vessels; hanging; aneurysms or other tumours pressing upon the jugular veins. In albuminuria and chronic Bright's disease, and sudden loss of blood, as in hæmorrhages, very often cerebral anæmia occurs.

*Post-mortem appearances.*—In the severe (active) form the large blood-vessels and capillaries of the brain are increased in size, the pia mater has a rose-coloured appearance in spots, or throughout its whole extent, the grey matter of the brain is red, the choroid plexuses are enlarged, and the sinuses contain an excess of fluid. In the mild (passive) form, the veins are distended, and the brain is of a pale colour. These appearances cannot be relied on long after death.

Post-mortem  
appearances.

*Symptoms.*—In the *mild form* the congestion is only temporary, as in spasmodic cough, and the face is livid; there is slight throbbing of the carotids, a constant dull headache, chiefly confined to the vertex or behind the head; mental irritability, vertigo, sometimes faintness, confusion of mind, impaired memory, indisposition to work, irritability of temper, sleeplessness or unrefreshed sleep, and often disturbed by dreams; there is dimness of sight; also noises in the ear or deafness; restlessness, and often twitchings, and fatigue on slight exertion. In the *grave form*, and where the supply of blood is suddenly interrupted, as in cases of sudden hæmorrhages or in hanging, the symptoms set in suddenly, there is some confusion of ideas, but with mental torpor instead of irritability, and drowsiness instead of sleeplessness. The insensibility may be partial or complete; and is only of very short duration. There may be delirium resembling chronic alcoholism, or convulsions followed by coma; the breathing is almost natural; the pulse is slow and infrequent, and often full; the face is flushed; there is throbbing of the carotids; and heat of the head. The pupils are contracted in the early stage, become dilated afterwards, and finally become natural. It is to be remarked that this condition is undistinguishable at its commencement from some forms of apoplexy, but cases undoubtedly occur in which apoplexy does not

Symptoms.  
Mild form.

Grave form.



supervene. Such cases have sometimes been spoken of as warnings for apoplexy, and it is a fact that after several such attacks true apoplexy does often occur.

*Termination.*—In the simple form the patient may return to his usual health in a few hours or a few days; but generally imperfect health often follows.

*Treatment.*—Keep the patient in horizontal posture. Avoid all mental exertions, and particularly all forms of anxiety. Apply leeches to the temples if necessary, the object being to draw blood away from the head. Give brisk purgatives, and apply sinapisms to the calves or to the chest, or give warm foot baths. Apply ice to the head. Give light diet. Avoid stimulants. Bromide of potassium is much used.

Chronic  
hydroce-  
phalus.

#### CHRONIC HYDROCEPHALUS.

Definition.

This disease is always congenital, and is of common occurrence. The fluid is accumulated in the arachnoid cavity, and flows into the ventricles.

Causes.

*Causes.*—The cause of chronic hydrocephalus is from the general nature of the disease presumed to be some venous obstruction within the skull, but what the precise nature and seat of the obstruction is is unknown. Chronic hydrocephalus may commence at a later period of intra-uterine life, or before the sixth month. It most commonly becomes obvious during the teething period. It often lasts for years.

Morbid  
anatomy.

*Morbid anatomy.*—The head is large in size. The unossified sutures yield to the pressure of the fluid, and become proportionately widened. The bones are thin and transparent, and the membranes thickened. The serum is found in the sac of the arachnoid, and in the lateral third and fourth ventricles, which become dilated. The quantity varies from two or three ounces to two to five

pints ; is watery, limpid, and colourless, of higher specific gravity than cerebro-spinal fluid, and contains albumen, chloride of sodium, and urea. The effect of the effusion upon the brain is unsymmetrical, its convolutions being flattened and spread out. The elevations and depressions of the convolutions become effaced. The consistence of the brain may be but little altered, or may be softer than natural.

*Symptoms.*—Physiognomy of the child is the earliest indication. Symptoms begin to show themselves in children from birth, or before the sixth month. They relate to—1. Progressive enlargement of the head. 2. General nutrition. 3. Nerve centres.

Symptoms.

*Enlargement of the head.*—The head is large, it falls from side to side if not supported ; in shape is round and globe-like, with a large and prominent forehead, the orbital plates are pushed down, the eyeballs are prominent and looking downwards, the fontanelles and sutures are wide apart, and the fontanelles are distinctly fluctuating. The scalp is thin and the bones creak on being pressed. The face has a peculiarly diminutive aspect owing to the inordinate size of the head, which is also aggravated by the emaciation, which is always present in such cases. The expression is stupid.

Enlargement  
of the head.

*General nutrition.*—The child feels cold, has a voracious appetite, vomiting, and constipation. The limbs are generally puny and shrunken. The skin of the head becomes tense and thin, the superficial veins distinct, and hairs scanty and poor.

General  
nutrition.

*Nerve-centres.*—The patient seems to suffer from headache, and the mental faculties are wholly or partially arrested in development. There is somnolence during the day, and wakefulness at night, peevishness, irritability, and depression of spirits, and muscular weakness, with loss of co-ordinating power of the lower extremities. The muscles

Nerve cen-  
tres.

often become rigid, and atrophied. There are tremors, rolling movements of the eyeballs and strabismus, and grinding of the teeth during sleep often occurs. As the case advances there is stupor, a slow pulse, dilated pupils, and picking of the nose and lips.

Terminations.

*Terminations.*—In favorable cases all nerve symptoms subside, appetite improves, and muscular power increases. Idiocy or loss of memory remains, or the patient is morose or irritable throughout life. In unfavorable cases prostration increases, and the pulse becomes rapid, while paralysis, coma, and convulsions follow, which end in death.

Diagnosis.

*Diagnosis.*—Two other conditions as *rickets* and a *large brain* are associated with a prominent forehead. Nearly all European shoemakers, and Hahnemann whose bust is so often seen in the windows of homœopathic quacks, are examples of the rickety forehead. The projection in them is primarily at the frontal centres of ossification, and the bone itself is not actually tilted forwards, hence if a vertical outline of the skull be drawn, and a horizontal line taken as its base (drawn from the root of the nose to the hollow below the occipital spine), and lines drawn from its middle point to the most prominent points of the frontal and occipital portions, it will be found that the frontal radius in the skull of rickets is exceeded by the occipital radius, while in hydrocephalus the reverse is the case.

Rickets.

Large brain.

The prominent forehead of a large brain, of which Cuvier, Lord Macaulay, and Dr. Whewell are remarkable examples, is distinguished from the projecting frontal bone of hydrocephalus by the horizontal condition of the supra-orbital plate, and from the rickety by the fact that it arises evenly from the supra-orbital ridge, and is not most prominent over the centres of ossification.

Treatment.

*Treatment.*—Is very uncertain. In children, as the

progress is slow, the fluid may be reabsorbed by long use of iodide of potassium, of mercury with iron in any form, and of various diuretics. Counter-irritations externally, or issues kept open for months may be tried. Good diet, and cod-liver oil are essential. Some recommend puncture, others compression of the head. Above all strengthen the system as much as possible. Procure sound sleep at night; give nourishing diet, animal food, sea baths, and free exercise in the open air.

### CONCUSSION OF THE BRAIN.

*Concussion of the Brain* is the result of a sudden shock from outside to the brain mass. Is characterised by fainting, stupor, sickness, and loss of motion and sensation. It may follow a heavy blow on the head, or a railway accident, or any external violence. The patient either rallies in a few minutes, or a few hours, or may die suddenly or after many days. Concussion of the brain.

*Morbid appearances.*—After instantaneous death there may be no lesion of the brain. Where death occurs after many days there may be some laceration or general softening of the brain. Morbid appearance.

*Symptoms.*—In railway accident, where the nervous system has received a shock, there may be no abrasion, no wound, or no ecchymosis. The symptoms are all subjective. In slight cases the patient recovers in a few minutes, merely complains of confusion of ideas, sickness, chilliness, and a desire for sleep. After a few days pain in the head is complained of, with slight diminution of motor powers; there may be epileptic convulsions, with nausea and vomiting, and the sight becomes impaired. In severe cases the patient lies as if in deep slumber, the pupils are insensible to light, the skin is pale and cold, the pulse is feeble, his sphincters relaxed, and his breathing Symptoms.



slow and laboured. There is confusion of thought, severe vomiting, inability to articulate, and paralysis of one or other extremities. Death takes place suddenly.

Prognosis.

*Prognosis.*—Unfavorable. Recovery is rare and extremely tedious, and leaves behind permanent impairment of the memory, irritability of temper, loss of smell, or taste, squinting, and even amaurosis. In rapidly fatal cases the danger is from prostration or shock; later on from excessive reaction, or from compression, or hæmorrhage, or from laceration of the brain substance.

Treatment.

*Treatment.*—Perfect rest is essential. If the extremities are cold apply sinapisms and warmth to the feet. During reaction apply constant cold to the head, and keep it elevated. The after treatment consists in bland nutritious diet, and perfect rest to the body and mind.

Sunstroke.

### SUNSTROKE (COUP DE SOLEIL).

Heat apoplexy.

*Heat apoplexy.*—Is an affection of the brain common in the tropics, and due to a prolonged exposure to the sun's intense rays.

Cause.

*Cause.*—An impure and damp state of the atmosphere. All those circumstances which depress or exhaust nervous energies, as overcrowding, want of fresh water, and reasonable comforts; excesses of any kind, both bodily or mental predispose to sunstroke; very often men are attacked while exposed in weather where the thermometer stands at 120°, while at the time their clothes are unsuited to the climate; those who freely indulge in alcohol are particularly liable to sunstroke.

Pathology.

*Pathology.*—It is due to a depressed condition of the functions of the brain, spinal cord, and the sympathetic ganglia, and may be attributed to the circulation of poisonous matters in the blood.

Morbid anatomy.

*Morbid anatomy.*—In cases of sudden death there is loss

of consciousness and also sudden stoppage of respiration. Very often such cases are attended with dilatation of the capillaries of the lungs and apnœa.

*Morbid appearances.*—Excess of venous blood in the sinuses of the brain, engorgement of lungs and liver and kidneys.

*Symptoms.*—Intensely hot, dry skin, which in sudden deaths even lasts for some time after death, severe headache, a sense of constriction about the chest, oppressed breathing, and great prostration. The patients frequently answer questions with weeping. The pulse is frequent, small, and soft; the face is pallid or of leaden hue; the conjunctivæ are injected; the pupils fixed, either contracted or dilated. There may be incontinence or involuntary passage of urine. There is great desire to sleep, and if allowed the patient soon becomes comatose and dies. Very often convulsions occur before death. These cases often present symptoms similar to those of apoplexy, epilepsy, or of hysteria. Where the disease is due to direct influence of the sun's rays the person is struck down suddenly. There is unconsciousness with stertor, a full and slow pulse, and intense heat of the head, and the patient dies comatose. In cases where the heat of the sun is excessive, and the thermometer standing at 120° even without exposure, phenomena similar to those of syncope occur. In such cases the whole system becomes affected. There is extreme prostration. The head is very hot; the pulse is feeble; at first there is no stertor; and active delirium is followed by drowsiness and coma. At first the pupils are contracted, but in a few hours when coma becomes more profound, the face is livid, the pupils become dilated, the breathing becomes stertorous, and death occurs from convulsions or coma. Symptoms.

*Treatment.*—Rouse the nervous energy, pour cold water from a height over the head and neck, and dash cold Treatment.

water on the face. Avoid tendency to sleep or coma by constantly speaking to him or shaking him. Give brandy and ammonia if he can swallow, in small quantities and frequently. Act freely on the liver and bowels. The sense of suffocation may be removed by rubbing turpentine over the chest. If the patient cannot swallow give stimulant enemata and apply mustard to the calves. As a prophylactic avoid heavy work in hot seasons, protect the head from the rays of severe Indian sun and during hot weather. The head-dress should cover both the head and the nape of the neck, and should have a shade for the eyes. It should be of basket work, and well padded externally, and covered by a white cloth to reflect the heat. It should leave sufficient space between the top of the head and the crown of the dress. The coat should be also of white cloth with lining and well padded, and should always be loose.

### CEREBRAL HÆMORRHAGE.

#### APOPLEXY.

Cerebral  
hæmorrhage.

Apoplexy.  
Definition.

It is most often associated with extravasation of blood within the cranium. *Apoplexy* is a term significant of a prominent symptom in embolism, thrombosis, and hæmorrhage into the brain. The term denotes a stroke, because the patient falls down as if from a blow. It means an attack of sudden coma without convulsions. There is a complete loss, for a time, of consciousness, of sensation, and of voluntary motion, with stertorous breathing. It is also called *apoplectic fit*, or a *paralytic stroke*. Hæmorrhage into the lung is called pulmonary apoplexy by a curious forgetfulness of the original meaning of the word. In the lung it is applied to an internal hæmorrhage.

Causes.

*Causes.*—Persons with protuberant bellies, large heads, florid complexion, and short thick neck, are said to be the usual subjects of apoplexy. It is certain that diseased blood-vessels are present in every case of apoplexy with

hæmorrhage. The disease is rare before forty, and occurs equally in males and females ; sedentary habits, high living, intemperance in food or drink, or cessation of habitual discharges, gouty diathesis, and diseases of the heart and kidneys, all predispose to it. Of these Thomson's lines express the commonest immediate cause—

“ Whilst apoplexy crammed intemperance knocks  
Down to the ground at once, as butcher felleth ox.”

The local cause of apoplexy is either hæmorrhage or obstruction of a cerebral artery. The hæmorrhage is due to rupture of a diseased vessel. The obstructions are embolism, thrombosis, tumours surrounding vessels, and small morbid growths within them.

*Morbid appearances.*—So far as the brain is concerned they vary with the seat of hæmorrhage. Some points are constant. The arteries at the base are atheromatous. There is often some effusion of blood on the surface of one hemisphere. Internally the tract of brain substance exhibits a chasm, which is occupied by a clot, and the brain substance around is softened. If the hæmorrhage have been into the corpus striatum or the optic thalamus, the clot will be in the ventricle, as in the torn brain substance, and owing to the distension of the ventricle the convolutions on that side will be flattened. If the hæmorrhage have reached the roof of the ventricle, sometimes one cerebral hemisphere hangs as a mere bag. It is not often easy to find the actual point of rupture of the vessel. Granular kidney, hypertrophy of the left ventricle, and atheromatous aorta are found in great many cases ; and associated with this there may be slight anasarca. When the hæmorrhage is from the capillaries it may be in scattered clots not larger than a pin's head, or in quantity large enough to fill all the ventricles, and even envelope the medulla and the posterior surface of the cerebellum.

Morbid  
appearances.

*Character of effused blood.*—The character of the effused

Character of  
effused blood.



blood varies. When recent it may be fluid or dark coloured and in clots; it dislodges part of the brain substance, and a cavity is produced, the walls of which are ragged. After a time the blood becomes dense, of a brown colour, sets up inflammation into the substance, and the cavity is smooth and covered with inflammatory exudations. In far advanced cases sometimes the exudation products or corpuscles are converted into hæmatin, there is hardening of red corpuscles by the absorption of serum and fibrin. The contraction takes place, the cavity is lessened in size, and filled with serous contents or traversed with fibrous bands, or may appear contracted and eventually cicatrized, the cicatrix enclosing remains of the clot. At other times the cavity does not contract, but remains distended with blood, and forms a radius for fresh hæmorrhage. Occasionally it gives rise to abscesses in the brain.

Effects of  
hæmorrhage.

*Effects of clots* on the surrounding tissues. They cause displacement of and pressure on the brain substance, and even lead to flattening of the convolutions and obliteration of sulci; they also lead to softening and œdema of the surrounding brain substance, and in few places to inflammatory mischief. The presence of blood crystals in a small vacuity in the brain is proof of a former hæmorrhage.

Seat of  
hæmorrhage.

*Seat of hæmorrhage.*—In five cases out of six this is the corpus striatum and the optic thalamus. Then follows white substance of the brain. It is rare in the crus cerebri, the pons, and the cerebellum; most rare in the medulla. The *quantity* of hæmorrhage varies from a few drops to several ounces.

Results of  
hæmorrhage.

*Results of hæmorrhage.*—Hemiplegia is found in most, but not in all cases where effusion takes place into the cortical substance of the cerebrum. These cases are generally accompanied by hæmorrhage into the tissue of the pia mater. When there is a clot in the cortical substance of the cerebrum, there are often general con-

vulsions and severe disturbance of psychical functions. Great degeneration of one hemisphere often produces no symptoms, and the convulsions are probably due to pressure on the other half of the hemisphere. Slight hæmorrhage in the pons and the medulla oblongata usually causes death. In hæmorrhage of the cerebellum, there is often paralysis of the opposite side, but this cannot depend on the cerebellum, for there is often no paralysis when this is extensively destroyed. Most cases of hæmorrhage, wherever its seat, shows great similarity of symptoms. Another series of symptoms does not depend on local injury, but on general effect on the brain. Thus, we have loss of consciousness with looseness of sphincters, the patient falls suddenly, and has stertorous breathing due to the falling back of the tongue, and to the soft palate being paralysed and made to vibrate by inhaled air. The inspiration is at long intervals. The pulse is slow, and the pupils are contracted. The fit may perhaps be due to a sudden compression of the cerebral capillaries, leading to anæmia of the brain substance. In such cases the pulsation of the carotids indicates that the flow of blood to the head is obstructed. This occurs where there is no hypertrophy of the left ventricle, and is very important in diagnosis. The protection of the medulla oblongata from the evil effects of the hæmorrhage is due to the tentorium. The effect on the other cerebral hemispheres is due to the less protective power of the falx. Hence very slight effusions below the tentorium are dangerous.

*Symptoms. Premonitory.*—Certain symptoms, which, however, only occur in some cases, are popularly known as *warnings* of apoplexy. They are chiefly due to the atheromatous condition of the blood-vessels. These are fugitive attacks of cerebral congestion, cold extremities, duskiness of lips and conjunctivæ; headache and noises in the ears, dimness of sight or double vision, repeated

Symptoms.  
Premonitory.

hæmorrhages from the nose, torpid bowels, and scanty urine, sense of pins and needles in the hands and feet, numbness in limbs; or mental depression, peevishness, transient delusions, incoherent speech, drowsiness with stupor, and a slight and temporary hemiplegia. These symptoms indicate the existence of degeneration of cerebral vessels, and of course may or may not be followed by apoplexy. Sometimes the patient may be quite well and his articulations at once become thick, and he may find his mouth drawn to one side; or, in a few cases, the patient on rising from bed in the morning finds one side of his body totally useless.

Of seizure.

Four ways.

First form.

*Of seizure.*—When the attack occurs it may be in one of four ways. 1st—There is a fit, the consciousness is not recovered, and paralysis extends to the medulla oblongata. In these cases the breathing is irregular, the pulse intermits, the pupils are dilated, and death takes place in

Second form.

a few minutes or a few hours. 2nd—The patient falls down suddenly, and becomes at once insensible; his face is flushed, breathing stertorous, and pulse full but slow. Soon there is a frothy mucus about the mouth, the skin is cold and clammy, the face pale, the eyes glassy, and teeth clenched, the lips and cheeks puff out with expiration, there is inability to swallow; the pupils are dilated or contracted, insensible to light, and often unequal. There is involuntary passage of urine and fæces; often urine is retained, and causes distension of the bladder and dribbling.

Third form.

This form is often succeeded by hemiplegia with dilatation of the pupil of the affected side. 3rd form—There is a sudden attack of severe pain in the head which makes him cry out. The patient soon becomes pale and faint, and drops down as if in a state of syncope. There is at first a slight loss of consciousness, but the headache continues constant, the mind becomes heavy and forgetful, and at

Fourth form.

last he becomes drowsy, comatose, and dies. 4th—In a

fourth set of cases there is hemiplegia from the very first, but later on there is loss of consciousness, and general paralysis ends the scene.

*Duration.*—Apoplexy is associated with immediate death Duration in popular belief, but the impression is erroneous, as death rarely occurs before several hours have elapsed. By far the commonest cause of the immediate sudden deaths we read of in newspapers is aortic disease.

*Termination.*—Where hæmorrhage is slight and hemiplegia the only result, the patient gradually recovers. Termination. In most cases the recovery is partial, and after a very long time, owing to some of the conducting nerve fibres, being absolutely severed by effused blood, and therefore motion is not completely restored. During paralysis the muscles are flaccid, and respond to both forms of electricity, the reflex excitability is also retained. The temperature of the paralysed limb is also slightly increased. Where the limb is painful and rigid from the first, the case is unfavorable. Generally the leg recovers before the arm. Where the arm recovered first it is believed that the case is a bad one, and the hæmorrhage was in the inferior part of the posterior lobe of the cerebrum. The permanent contraction of the limb, with wasting of the muscles, occurs where paralysis has lasted for a very long time.

*Diagnosis.*—If the attack be of an ordinary kind, there Diagnosis. is sudden seizure of pain, and giddiness followed by hemiplegia, the diagnosis is easy. If there be deep coma after a sudden fall, and there is also paralysis, the diagnosis is difficult. It may be a case of injury, apoplexy, of poison, or drunkenness. In complete insensibility there may be a large quantity of effusion at the base of the brain or in the pons, and the pupils are contracted. In opium poisoning there is very slow breathing, which is not seen in apoplexy. In apoplexy the patient has involuntary passage of fæces soon after the fall, not so in poisoning or drunkenness. If



the patient be semi-conscious the case may be mistaken for concussion, drunkenness, or uræmic poison. In these cases the pupils are of ordinary size, and there is no paralysis. The suddenness of the attack may be from embolism if the patient has previously suffered from heart disease, and had a fit of hemiplegia; or from fibrinous clot which plug the blood-vessels of the brain, and cut off the nutrition and function of the part of the brain supplied by them. In effusion, on the other hand, the attack takes place more slowly. The left cerebral artery is more liable to embolic plugging than effusion shows that right hemiplegia is more due to embolism than the left, and as the cerebral artery also supplies the convolutions there is also aphasia with hemiplegia.

Prognosis.

*Prognosis* of course depends on the seat and extent of the lesion, and on whether hæmorrhage has definitely ceased or is likely to be continued. It is therefore bad in all cases in which the symptoms have gradually increased in intensity. In favorable cases the blood is reabsorbed or may remain as an encapsuled mass, and consciousness is soon restored, although the memory may continue unimpaired for some time, and sensibility and the power of motion gradually improve. Occasionally the recovery may be incomplete, and permanent dementia or hemiplegia may remain.

Treatment.

*Treatment.*—When predisposition to hæmorrhage is suspected, endeavours must be made to avoid those causes which lead to it. The patient should have a spare diet, no alcohol, no heavy meals, no excesses of any kind. Sleep should be procured in a cool ventilated room on a mattress, with the head placed high. The bowels should be opened by a brisk purgative. If headache or giddiness be present let the head be kept cool and well raised, and any strain avoided. If headache be constant a few leeches may be placed on the temples. An issue or a seton in the neck, or

a blister to the nape of the neck may prove serviceable. During the attack endeavours must be made to treat symptoms as they arise. If the urine is not passed it must be removed by a catheter. The patient must be removed into a cool room, should be placed on his side to avoid stertor, which is due to falling back of the tongue and flapping to and fro of the soft palate. If there be tendency to syncope, the head should be placed high on pillows, and the dress about the neck should be loosened. In all these cases bleeding should be tried with the utmost caution.

The statistics prove that the mortality has been great where bleeding has been too freely practised. The patient is generally seen late, and even after the plugging of a cerebral vessel, or after the rupture with extravasation of blood has already taken place. Very often the fit may be due to atheroma or other diseases of the cerebral vessels, or to disease of the heart, or of the kidneys, and depletion in these cases, by inducing greater thinness of the blood and by further diminishing its power of coagulation, promotes, instead of checking hæmorrhage. In cases where the pulse is full or hard, the vessels of the neck congested, and the face flushed, and the patient seen early, it would be justifiable to bleed. If the patient can swallow, active purgatives are serviceable. Where the power of deglutition is lost two or three drops of croton oil should be put on the tongue, nutritive enemata should be thrown up the rectum, and mustard plasters applied to the præcordia and to the calves; blisters to the scalp or to the neck should be rigorously avoided, as they lead to gangrene. Should the patient recover from the fit, shave the head and cover it over with ice or cold compresses, and keep the bowels freely open. He should be kept on liquid diet for a long time, all stimulants being avoided.

## CEREBRAL EMBOLISM AND THROMBOSIS.

Cerebral  
embolism.

Embolism is something carried away from a distant part of the system and lodged in a vessel. If a clot be formed locally at the spot occluded the term used is thrombosis.

Causes.

*Causes.*—Embolism of cerebral arteries may be remotely due to valvular disease of the heart, to aneurysm, or to mere atheroma. Emboli may be from detached clots or may be actual pieces of growths or of atheromatous plates.

Thrombi.

Thrombi are associated with degeneration of the arteries at the base of the brain in feeble persons and those advanced in life. The vessels are thick, atheromatous, and reduced in calibre, and are impervious or become obstructed by a highly fibrinous blood or by a clot.

Seat of  
embolism.

*Seat of embolism.*—The most frequent seat of embolism is the Sylvian or middle cerebral arteries, especially the left. The result of this embolism is at first anæmia of the portion of the brain which this artery supplies. This is followed by softening, œdema, and subsequent degeneration. There is determination of blood in the surrounding adjacent capillaries, which often rupture and give rise to capillary hæmorrhage. The effects, whether due to embolism or thrombosis, may disappear in course of time in young persons whose vessels are healthy. But in arterial thrombosis the vessels are extensively diseased, and white softening follows. Obstruction from thrombosis is common in the vertebral and internal carotid arteries. It is often connected with degeneration, and is then a phenomenon of old age. As a consequence of syphilis it occurs in middle life.

Effects of  
obstruction.

*Effects of embolism.*—The changes which result upon obstruction to the cerebral arteries are limited to the

part of the brain which the obstructed vessel supplies. The brain substance so affected becomes soft and pulpy, or yellowish or greenish, and mottled with red patches, and can easily be washed away under water. Granule cells, degenerated nerve elements, and fat granules are seen under the microscope. The obstruction also leads to deficient nourishment to the part which the artery supplies. The part of the brain beyond this affected part is softened and has lost its functional activity.

*Symptoms of occlusion.*—These have a general resemblance to those caused by hæmorrhage, but the loss of consciousness is less complete. The symptoms of obstruction or occlusion set in suddenly in cases of embolism, but are gradual and slow in thrombosis. They resemble those of cerebral softening. The seizure comes on in a healthy patient without warning. It comes on in various ways. 1. The patient while walking is attacked with a sudden vertigo, confused thoughts, and he falls forwards to the ground. 2. Sometimes he awakes with a severe pain in the head, and cries out; or 3. He may suddenly faint and become convulsed. Sooner or later after these symptoms have passed away there is more or less hemiplegia present. The symptoms vary with the size of the vessel obstructed and with the part of the brain to which the obstructed vessel is distributed. Where the posterior lobes and cerebellum are affected the symptoms are obscure. There is more or less complete hemiplegia, associated with anæsthesia and impairment of intelligence, and if embolism be on the left side of the brain there is also aphasia or total inability to articulate sounds. These symptoms are often associated with vertigo, headache, vomiting, rigidity of the limbs, and loss of control over the bladder and rectum, but these are not symptoms of special softening. In cases of thrombosis obstruction takes place at several intervals, and in several cerebral

Symptoms of  
occlusion.



arteries, and each attack adds its own special symptoms to those which have previously exhibited.

**Terminations.** *Terminations.*—If the obstruction be small recovery takes place. This may be incomplete; the other symptoms disappear, but mental and motor failures continue. Hemiplegia persists, and contraction and muscular wasting result. The intellect may also fail, and patient becomes bedridden and childish; bed sores are then common, and occur early. Aphasia may persist or pass off in part. It usually improves soon if at all.

**Prognosis.** *Prognosis.*—As to complete recovery is bad. Patient often survives aphasic.

**Diagnosis.** *Diagnosis.*—Often confounded with cerebral hæmorrhage. In hæmorrhage the symptoms vary with the seat and hæmorrhages are seated in parts different from the seats of obstruction. In embolism there may be previous history of rheumatism or heart disease. In thrombosis the history or signs of syphilis may be observed. In hæmorrhage there is presence of albuminuria and history of chronic Bright's disease, or degeneration of artery from old age. Hæmorrhage occurs at an old age, but embolism at all ages from puberty upwards. In hæmorrhage there is a gradual development of symptoms, ending in hemiplegia and coma. In embolism there is sudden and complete hemiplegia, without loss of consciousness and without any premonitory symptoms.

**Treatment.** *Treatment.*—The same as is adopted in cases of paralysis after hæmorrhage.

### SOFTENING OF THE BRAIN.

Softening of  
the brain.

By *softening* we mean a chronic change in the brain substance, whereby it becomes disintegrated, and its function lost. What we call acute softening are only cases of acute inflammation (Encephalitis) running on in a

few days to one of its effects, just as in pneumonia, softening of the lung occurs. Very often the word softening is meant to designate cases where slight impairment of brain function or slight paralysis has taken place without any real softening. The acute softening is often called red softening.

*Causes.*—Acute softening is due to thrombosis. Is Causes. common in middle and advanced age. In it coma is imperfect; there is paralysis without loss of consciousness; subsequently rigidity of muscles of the extremities. Progress is very rapid, and death takes place in a few days.

White softening may be due to old age, to intemperance, to undue excitement or embolism. Its progress is slow and insidious. Symptoms last for many months. In it there are neuralgic pains, with numbness and paralysis; dulness of the senses, and of mental powers. White softening is due to every change which interferes with the nutrition of the brain. It occurs in weakly old persons who are suffering from renal or cardiac disease, or in cases of diseases of the coats of the cerebral arteries. The unhealthy blood reaches the affected part, which is therefore imperfectly nourished, and is also incapable of repair.

*Post-mortem appearances.*—In the so called acute or red Post-mortem appearances. or inflammatory softening, the brain substance, which is generally the white substance of the hemispheres, is degenerated with exudation into the texture of a serum, with albumen and blood corpuscles, thus causing the centre of softening to present the appearance of a red mass. In white softening the softening may be slight and limited, or extensive and diffuse. The colour of the brain is usually yellowish-white, or pure white. The consistence varies from the natural feel to a fluid pulp, its is best determined by touch, or by pouring a gentle stream of water upon it. In white atrophic softening on section the softened portion appears swollen, and rises above the sur-

rounding level. The specific gravity of the softened part is below that of the normal brain substance. Under the microscope there is destruction of the nerve elements, granular degeneration of the cells of the neuroglia, granular fatty débris and blood pigments, and granulation corpuscles.

Seat of  
softening.

The most frequent seats of softening are the corpus striatum, optic thalamus, central white matter of the hemisphere, and the convolutions. In softening from embolism the left hemisphere is the part most affected.

Yellow  
softening.

Yellow softening may be the advanced form of the red variety, but is also described as an idiopathic affection. It affects the cerebrum and central masses of grey matter. The affected parts appear pulpy, and of the colour of sulphur. On section a clear yellowish fluid oozes out, it rises above the level of the surrounding brain substance, no trace of natural structure being left. Beyond the soft part we find brain substance in a state of inflammation, or the existence of some morbid growths, or of an apoplectic clot in the adjacent brain substance. Where there is much disease of the blood-vessels, the whole brain may contain soft patches, but where softening is local and limited cases go on for months, and ulterior changes result. In such cases merely a vacuity is left, containing whitish fluid, and blood-vessels, and the cavity is lined by a smooth and thick membrane. In cases of encephalitis in the adjacent brain substance an abscess is found.

The softening which occurs in old age is local and due to disease of the cerebral vessels, causing plugging of an artery by a fibrinous clot in some diseased vessel. This condition of the brain resembles that of gangrene of the foot in old people.

Symptoms of  
red softening.

*Symptoms of acute inflammatory softening.*—It is characterised by premonitory giddiness, mental aberrations, loss of memory, and disinclination to work. These symptoms are soon followed by an attack of hemiplegia, rarely with,

but generally without, loss of consciousness, or by convulsions. The disease often commences with an epileptic form of convulsions, which recur repeatedly, leaving the mind more and more impaired, and ultimately end in hemiplegia. If due to embolus the premonitory symptoms are absent, and the attack is sudden. If to thrombus there are premonitory symptoms, and the attack is slow. In persons suffering from rheumatic endocarditis a third form is found; there is sudden delirium and violent chorea, ending in hemiplegia, which is associated with aphasia.

*Symptoms of chronic white softening.*—These are persistent agonizing pains in the head, frequent attacks of vertigo coming on suddenly and soon passing off; progressive impairment or loss of intellect and memory, depression of spirits, embarrassment in answering questions, affections of speech, shedding tears on the slightest excitement and emotions; numbness and pricking sensations are complained of; often twitching of limbs with cramps, stiffness or contractions of muscles; generally, however, a tendency to drowsiness after food is very common; delusion, and slowly advancing paralysis. As the case goes on the respiration becomes more and more laboured; there is stertor followed by delirium, convulsions, or coma, ending in death. In softening of the cerebellum the symptoms are peculiar; there is tottering gait, tendency to walk backwards, emotional and semi-convulsive agitations, and aphasia.

Symptoms of  
white softening.

*Terminations.*—It may end in delirium, or convulsions, or apoplexy. In long-continued cases paralysis of the limbs or half of the body, or muscular weakness, with pain or contractions or rigidity of a limb, or numbness or formications, are common. There is difficulty in answering questions, difficulty in passing water, and stools are passed involuntarily; the patient walks with a tottering gait,

Terminations



requires to be goaded for food or drink or for natural purposes.

*Diagnosis.* *Diagnosis*.—White softening occurs in old age. Its progress is slow and insidious. Its diagnosis can seldom be very positive.

*Treatment.* *Treatment*.—Sustain the general health and strength; diet should be given at regular hours, in small quantities and in liquid form, and should be such as can easily be digested; the patient should have fresh air, and gentle exercise short of fatigue; stimulants should be used in moderation. As there is tendency to constipation, a gentle purge will be needful. For sleeplessness, chloral hydrate or potash bromidum or conium may be tried. If the patient be young, nervine tonics, as preparations of phosphorus, strychnine; these will often restore power in paralysed limbs.

#### Encephalitis.

#### ENCEPHALITIS.

*Definition.* Signifies inflammation of the brain, and is divided into general and local cerebritis. The inflammation usually ends in softening of the tissue, but in some cases the inflammatory products become organized or indurated, constituting sclerosis. Hence sclerotic patches are often known as inflammatory grey degeneration or induration. The circumscribed patch often resembles a new growth.

*Causes.* *Causes*.—Is not induced by causes which induce inflammation in other organs. It may occur in the course of continued fevers, measles, or scarlatina, or may follow upon chills or exposure to the sun; may be due to direct injury or fractures, or wounds, to poison in the blood, as gout, and excesses of any kind. In most cases it is due to extension of inflammation from without; it may follow upon inflammation of the membranes or of the bones of the skull, and especially of the internal ear, and may be referable to extension of erysipelas of the skin. It may also arise

from presence within the brain of foreign bodies, as a clot or morbid growths. Is sometimes referable to pyæmia.

*Post-mortem appearances.*—In most cases the inflammation is limited in extent, sometimes limited to the grey matter, sometimes to portions of the white, and sometimes to both. It is often associated with inflammation of the membranes. There is more or less vascularity of the membranes and substance of the brain; the membranes are of a bright or deep red colour; often opaque, and there is fluid (serum, lymph, or pus) in the meshes of the pia mater and beneath the arachnoid. On section of the brain minute red clots are seen in the medullary portion. In some cases the membranes are of a dusky red hue, and there is exudation of pus either upon or between the convolutions, or in the form of abscesses in one of the cerebral hemispheres. The ventricles are distended with fluid, and their whole surface is granular. The substance of the brain shows degenerative changes; it assumes the consistence of thick cream, and can be readily washed away by a gentle stream of water. There is also serous effusion between the pia mater and the ventricles, and this effusion may be yellow, green, or red, from admixture with blood, or fetid, and alkaline, from containing pus cells and abundant granular matter, or it may become cheesy, inspissated, or calcified, and surrounded by a firm capsule. Thus, with the progress of the inflammatory process pus cells accumulate, and the portion affected loses its consistence, and is yellowish or greenish. The abscess is surrounded by still solid but easily lacerable tissue, and contains fetid, thick, yellowish matter. The abscesses are mostly solitary unless due to pyæmia, when they are many in number. They are generally secondary to diseases of the ear or nose, their chief seat being the middle cerebral lobe; rarely the pons Varolii. If inflammation be the result of some violence the dura mater and the other membranes are all thick-

Post-mortem  
appearances.

ened, and there may be a deposit of false membrane between the dura mater and the bone. Where the inflammation is diffuse over the whole brain there is extensive inflammation of the superficial grey matter, which is red, soft, and adherent to the pia mater. In local inflammations the portion of the brain substance is soft; its specific gravity is increased, the colour is yellow or green, from its infiltration with exudation or pus. When due to injury, or bone disease, or pyæmia, it generally terminates in abscess, which may be single or multiple. When single it is usually seated in the white substance in the centre of the hemisphere, and when multiple chiefly near the surface of the hemisphere. It may be small as a pin's head, or large as an egg. When a single large abscess occupies the hemisphere its convolutions become flattened. The shape of the abscess is round or oval, its walls rugged, soft, and inflamed, or there may be a fibrous or fibro-cellular capsule formed and lined by a smooth membrane. It may be tolerably healthy.

Symptoms of  
acute in-  
flammation.

*Symptoms of acute general inflammation* are indefinite. The disease is rare. The progress is very rapid and attended with high fever, violent delirium, coma, and death. In rare cases the patient may be sick for some time from headache, and there is obvious vomiting without a cause, slow pulse, and constipation. Such cases occur in patients who drink continuously for days or weeks, and in cases of sunstroke.

Symptoms  
of acute local  
inflammation

*Symptoms of acute local inflammation.*—A dull, heavy, and continuous pain in the head, acute and liable to increase from noise or any exertion, a flushed face, hot head, irritable and fretful expression, betokening suffering from pain, a desire to be left alone, intolerance of light or sound, increase and afterwards decrease of the sensibility, mental disturbance leading to violent or low muttering delirium, or convulsions, or paralysis, or stupor, ending in

coma ; very often convulsions occur. The pupils are contracted in the commencement, later on they may become unequal, and in the state of coma widely dilated. The pulse is at first hard and slow, or frequent, sometimes irregular ; later on it is extremely rapid and feeble. The respiration is irregular and sighing ; there is slight fever, but the temperature is seldom above  $102^{\circ}$ . The abdomen is retracted and hollow, and there is either retention or dribbling of urine. Vomiting is most common in the early stages, with little or no nausea, and continues even after the stomach is empty. Is excited by the least movement. The tongue is clean, the breath is sweet, conjunctivæ injected or colourless, and headache before vomiting. The bowels are constipated, stomach emptied without retching ; there is no salivation, and vomiting, if allayed, it is only by some counter-irritation to the nape of the neck, and after vomiting the patient asks for food. The appetite is sometimes ravenous.

The complaint sets in in various forms. The most common form, where inflammation is idiopathic, the symptoms begin with headache and vomiting, with frequent and hard pulse, sighing respiration, constipation, followed by delirium ending in coma. Various forms.

In cases where inflammation is due to the presence of foreign bodies in the brain the symptoms are those due to clots, or softening, or tumours, and there may be a slight accession of fever, slight headache or giddiness, failure of appetite, impairment of memory or intellect, delirium, convulsions, or coma, or rigidity of the already paralysed limb, or hyperæsthesia, or pain in the paralysed muscles and joints, with tendency to rapid bedsores. In other forms the convulsions are generally severe, may be sudden, often followed immediately by coma, ending in death in a few hours, or the convulsion may recur frequently at short intervals, ending in coma in a day or two.



In another class of cases, after a period varying from one to two days, collapse sets in. The patient is in a state of stupor, his voice sinks into a whisper and becomes indistinct, vision and hearing are much impaired, the pupils are quite dilated, and muscular twitchings occur. This soon passes into a low adynamic condition, the body being covered with cold sweats. There is involuntary passage of urine and fæces, a few convulsive fits precede coma, and death occurs.

Symptoms of  
suppuration.

Where inflammation runs on to suppuration or to softening, all the symptoms are aggravated, and the patient complains of increased fever, with rigors, of cerebral vomiting, and constipation, of headache at one fixed spot, giddiness, delirium, dulness of intellect, of coma or convulsions, or paralysis of special senses, or of speech, and of want of control over bladder and rectum. Where the abscess is encysted the disease may continue latent for months without any manifest symptoms of its presence. In abscess the symptoms vary with its size, its position, and the disease with which they are associated, as pyæmia, otitis interna, erysipelas. Thus, if pyæmia be present the fever will be high and attended with rigors, but should the abscess be encysted there will be little or no fever.

Fever.

Pain.

Pain is another symptom of cerebral abscess, and when coexistent with disease of the bones or of the dura mater, it is most marked and often referred to a particular spot, as the eyes, temples, or back of the head.

Paralysis.

Paralysis affecting nerves of special or common sensation depend on the size rather than upon the seat of abscess. A large abscess causes hemiplegia on the opposite of the body. If the abscess be in the pons Varolii or in medulla oblongata, there will be paralysis of spinal nerves, and respiration and deglutition may become affected. It should be borne in mind that a few cases are on record in which the symptoms were altogether obscure.

*Progress of suppuration.*—Is marked by a stage of irritation, a stage of abeyance of cerebral functions, and a stage of collapse. Thus we may observe in the first stage headache, giddiness, intolerance of light and sounds, wakefulness, delirium, and vomiting. In the second, disappearance of headache and pain, with paralysis, drowsiness, stupor, involuntary evacuations of urine and fæces, and occasional convulsions. Progress of suppuration.

*Duration.*—Death may occur as early as the fifth or sixth day, or as late as the fourth week. Death is preceded by coma or may be due to asphyxia or to asthenia. Duration.

*Treatment.*—We have strictly to adhere to antiphlogistic regimen; the diet should be low; purgatives, digitalis, and antimony, with mercury, may be given. The head should be shaved and ice constantly applied. Leeches to the temples or bleeding from the arm till the patient faints are useful, and internally iodide of potassium is the only reliable remedy. Treatment.

## CHRONIC ENCEPHALITIS—SCLEROSIS.

Chronic.  
encephalitis.

Sclerosis is an inflammation which involves both the membranes and the brain. Like cirrhosis of the liver it is marked by a slow development of fibrous tissue among the essential brain elements, and followed by gradual degeneration and wasting of these elements. Sclerosis.

*Post-mortem appearances.*—On opening the skull the dura mater is adherent to the bones, the arachnoid is thick and opaque in parts, the pia mater is adherent to the brain and highly vascular, and the membranes are also adherent to one another. There is fluid in the subarachnoid space and in meshes of the pia mater, and also in the ventricles; the Pacchionian bodies are increased in size. In a vast majority of cases there is, at first, an overgrowth of the neuroglia by the Post-mortem appearances.

deposit in it of newly formed cells, and also by the increase of the intercellular substance. As the case progresses the enlarged neuroglia contract and harden, the newly developed cells become indistinct, its blood-vessels, by being compressed, become narrowed and thick walled. The nerve tubules and nerve cells are widely separated by these adventitious growths, the white substance of Schwann which these tubes contain disappears, and the tubes therefore become thin. In far advanced cases the tubules are greatly atrophied, and even, in rare cases, destroyed. The portion of the sclerosed brain appears indurated, and if of long standing there is tumefaction with more or less contraction; the affected part is also adherent to the pia mater. The disease has a tendency to be limited to certain tracts or nerve centres. Very often the sclerosed patches may be numerous and scattered irregularly throughout the nerve centres, and it is then known as multiple or disseminated sclerosis. In this last form the patches appear in the cerebrum, cerebellum, pons, medulla, and even in the cord, either collectively or separately.

**Causes.**

*Causes.*—Diffuse sclerosis is a disease of adult life, between twenty and twenty-five, it is rarely seen after thirty years. It is more common in women than in men, and is attributable to some previous injury to the skull, chronic alcoholism, irritation of syphilitic or other morbid deposit, mental excesses, and exposure to wet and cold.

**Symptoms.**

*Symptoms.*—They are allied to those which mark the commencement of insanity. Thus, we find great mental excitement or depression; more or less constant general headache, vertigo, peevishness, restlessness, irritability, and want of sleep. As the case progresses there is failure of the intellect, and the patient becomes low-spirited, apprehensive, and demented; the memory fails, all the external senses get impaired, there is tendency to

stupor, paralysis sometimes sets in, and the health completely breaks down. In old persons the mind is dull, energy and vitality are lost, speech is indistinct, and the gait tottering; constipation and irritability are present, and the disease ends gradually in fatal exhaustion. In some cases irregular epileptiform convulsions occur, which are not followed by coma.

*Treatment.*—Support the general health of the patient by judicious hygienic measures. As the disease attacks the old, milk, beef tea, and liquid nutritious food are essential. To promote absorption, repeated blisters to the neck, or seton, or an issue, or an inunction of mercurial ointment, and iodide of potassium internally, may be useful. The state of the bowels should be attended to. Strychnia and nitrate of silver, and arsenic, belladonna, ergot of rye, and bromide of potassium, have been tried without obvious good. Treatment.

### ABSCESS.

*Abscess of the brain.*—It is not a usual result of inflammation, and may be a probable consequence of injury, or of caries of bone, or as a secondary formation in pyæmia. In many cases abscesses become encapsuled, and thus cut off from the surrounding brain substance, and so no symptoms are manifest. Very often the pus is surrounded by softened brain, and the pus is fetid. Very often the abscess is in connection with the caried petrous portion of the temporal bone. In the later cases the abscess is generally in the cerebrum or the cerebellum, the dura mater is affected, and is sloughy, and the bone also carious. In long-standing cases of disease of the internal ear, if there are cerebral symptoms present such as severe pain in the head, rigors, vomiting, and convulsions, an abscess in the brain may be suspected. Abscess of the brain.



Morbid  
growths.

### MORBID GROWTHS.

Definition.

These adventitious growths are of various forms. Miliary tubercles of the pia mater have already been described under tubercular meningitis. Another variety of tubercles are formed within the brain substance. These are rounded, yellowish masses of a caseous appearance, dry and bloodless, and continuous with the brain substance or disintegrated at points. They are made up of aggregations of smaller masses, may be solitary or in masses, and occupy the grey matter of the cerebrum, cerebellum, and cord. It also invades the pons, the medulla oblongata, the optic thalami, and corpora striata. In size they vary from a mustard seed to an egg. They are soft in the centre, often containing cavities. They are more common in boys than in girls, and seldom exist before two years or after seven.

Syphilitic  
growth.

*Syphilitic growths.*—Their chief seat is the dura mater, and they are associated with disease of the cranial bones. They affect the brain by pressure. Similar growths are secondarily found in the arachnoid and pia mater, and even in the substance of the brain. In structure and appearance they resemble gummata. They may be solitary or diffused, or are regular nodules, and attain the size of an egg. On section they look yellowish, and are of cheesy consistence. Syphilitic disease has a tendency to affect the parts at the base of the brain, and consequently to involve nerves.

Syphilis has tendency to obstruct cerebral arteries with thrombi, and also to cause the thickening and induration of their walls, so that the canals of the vessels are subsequently obstructed.

Myxoma.

Other neoplastic tumours are myxoma originating in the membranes and the cord, and found in the cerebral hemispheres; they often attain large size, and are cystic growths.

*Glioma* is a tumour formed of delicate fibres originating in a growth of the neuroglia or connective tissue of brain, retina, or of the nerves. It is special to the nerve centres, and is greyish or pinkish, resembling the grey matter of the nerve centres. There are two forms, hard and soft; the hard is difficult to distinguish from sclerosis of the brain; the soft is a variety of sarcoma, and arises in the neuroglia or interstitial connective tissue of nerve centres, but is always very vascular, and consists of cells. The growth is inseparable from the brain substance. Such tumours are of slow growth, and often attain a large size. Glioma.

*Sarcomatous* growths occur in the substance of the brain and cord, and are of two kinds, hard and soft. The soft is white or grey, vascular, and resembling brain substance. The hard variety resembles fibroma; but is rarely malignant. Sarcomatous.

*Carcinoma*.—Sarcoma, glioma, and other tumours are varieties of carcinoma. Carcinoma rarely exists as a primary affection in the brain or cord. The scirrhus, encephaloid, and melanotic do occur as secondary growths, and occupy the brain, cord, or the bones, and even the membranes. When it exists it has tendency to extend, and it has a tendency to narrow the bony canals through which nerves pass, and thus compress and destroy them. Carcinoma.

Other morbid growths are the entozoa, which rarely infest the human brain. These are *cysticercus cellulosa* and *hydatid*. Both are extremely rare. Hydatids may exist in the cerebral hemispheres or in the cerebellum, and may even affect the meninges. When they do exist they may remain latent without producing any inflammatory changes. Entozoa.

*Aneurysms of the cerebral arteries of the brain*.—Aneurysms on the exterior of the brain have been recognised, and occasionally in the substance of the brain. When small and numerous they are called *miliary aneurysms*. Aneurysms of the cerebral arteries of the brain.

When in large vessels they cause apoplexy. They chiefly implicate the internal carotid, the basilar, and the middle meningeal. They vary in size from a pea to a small nut. They often compress the nerves at the base of the brain.

*Symptoms.* *Symptoms* vary with situation, size, shape, number, and rapidity of growth; and also depend on the mechanical effects of the tumour, and on the softening or chronic inflammation which they set up after a time. Tumours are often situated in the depth of the hemisphere without affecting central ganglia.

*Of tumours.* Very often tumours (hydatids) may remain latent throughout, or may by pressure lead to congestion of the vessels, or, as in aneurysms, to hæmorrhage and to sudden apoplectic fits. The earliest symptoms are headache, or giddiness and general weakness. The symptoms are severe, constant, and sometimes localised headache, accompanied with cerebral vomiting, giddiness, impairment of special senses. The headache after a time becomes paroxysmal. If the tumour be at the base of the brain, the third, fourth, or fifth nerves are affected, and amaurosis ensues; there are severe neuralgic pains, followed by loss of sensation, and partial loss of motion, also paralysis of the eighth or ninth nerve, leading to impairment of speech and deglutition and disturbance of respiration and circulation. If the tumour is at the surface of the hemispheres, epileptic convulsions unattended with loss of consciousness occur. When it presses on the central ganglia, or the crura cerebri, hemiplegia sets in gradually. If the tumour be in the cerebellum a peculiar staggering gait is seen. If one of the hemispheres is affected there may be hemiplegia, rapid formation of bedsores, with severe suffering, want of sleep, emaciation, and cachexia. The disease often terminates fatally, without warning. The diagnosis can only be arrived at indirectly. Thus, in a

*Termination.*

tumour occurring late in life the probability is of a cancer ; in childhood of tubercle ; where nodes exist of syphilis.

*Pathognomonic symptoms.*—These are giddiness, sickness, headache, convulsions, and amaurosis. Vertigo is rarely absent, is the first symptom, and is often the most constant. Headache is a prominent symptom, and is associated with giddiness and vomiting ; is often persistent and agonising ; is rarely absent ; is sometimes as severe as if the head would burst. It may sometimes affect the front or the back of the head, and sometimes be referred to the vertex. In some cases it shoots through the temples and involves the eyeballs. Vomiting sets in from the first, and is often an indication of a tumour. Sometimes the organs of sense, as the eye, ear, tongue, and nose, and occasionally the mind, become deranged. It generally comes on without a cause, and is attended with nausea, loss of appetite, and constipation. Slow and irregular pulse is often an early symptom of a tumour in the brain. Hemiplegia is absent from the first ; may come on at a later stage of the disease. In some cases the onset of the tumour is marked by apoplexy or by an epileptic fit, or paroxysms of convulsions, and this is soon followed by hemiplegia. Slight paralysis, as of face or arm, is always present in tumours, and is often associated with perverted sensibility. The local paralysis is due to pressure of the tumour on nuclei of origin of the affected nerves, or in some part of their course, or to the implication of their nuclei of origin in the morbid process. Thus, in some cases we have single or double external squint ; in some paralysis of the whole or part of the third nerve, involving ptosis, internal rectus, and external squint ; in others portio dura is affected and Bell's palsy results. In all these local paralyzes the electric contractility disappears, and wasting of muscles rapidly ensues. The sensory nerves are also implicated ; and the fifth occasionally suffers. In some

Pathognomonic symptoms.

Vertigo.

Headache.

Vomiting.

Special senses.

Paralysis.



cases the surface of the eyes is liable to get inflamed. Sometimes the olfactory nerves are affected, and smell or taste is impaired or lost. The affection of the eye is most important; there may be double vision or obscure vision, or total blindness of one or both eyes. All these local symptoms may come on at any period, and increase with the advance of the disease. In later stages they become permanent.

Mental disorders

*Mental disorders.*—The earliest indication of the tumour is known by delirium, failure or defective speech, loss of consciousness, followed by paralysis, or in some cases epileptic, hysteric, or apoplectic convulsions, occur. In a majority of cases these fits only occur at a later stage, and generally before death. The failure of memory or of control over the bladder and rectum is common.

Bedsore.

*Bedsore* are common results of tumours, either giving rise to inflammatory processes, or, at a later period to paralysis, when the patient is bedridden.

Duration.

*Duration* varies from a few weeks to many years. Death occurs from bedsores, or from convulsions, or is ushered in by coma.

Diagnosis.

*Diagnosis.*—Tumours are confounded with *apoplectic effusions*, *emboli*, *abscess of the brain*, and *sclerosis*. They all occupy certain portions of the brain, are all liable to swelling, inflammation, and softening. The determination of tumour is best done by the knowledge that certain tumours occupy certain parts of the brain, and that tubercles are limited to children. *Syphilitic* tumours occur in adults, and there would be a distinct history of syphilis. These tumours affect the base of the brain and the nerves therein situated. They cause headache, defective smell, deafness, defective vision, paralysis of portio dura, and bulbar paralysis. Patients suffering from them are liable to thrombosis of cerebral arteries. *Malignant* tumours are generally secondary, and

the patient must suffer from malignant disease elsewhere. *Hydatids* may exist if the patient be young and have hydatids in other parts, also there are absence of constitutional symptoms and of indications of inflammation and softening. It is worth recollecting that though hydatids of the brain are so uncommon in man; they are of common occurrence in sheep. *Aneurysm* is suspected if a sudden apoplectic fit occurs and death results.

*Treatment.*—All that can be done is to alleviate urgent symptoms. Thus, vomiting may be relieved by cooling drinks and various other remedies already fully detailed. The pain may be relieved by cooling lotions and local sedatives, and also by internal sedatives. If tubercles are suspected they are generally of slow growth, and therefore treatment by cod-liver oil and other methods adopted for tuberculosis may be tried. Syphilitic tumours often improve under anti-syphilitic treatment.

Treatment.

## DISEASES OF THE SPINAL CORD.

Spinal cord.

The spinal cord is a centre of motion and sensation to the trunk and extremities, bearing an intimate connection with the brain. The indications of the diseases of the spinal cord are: local manifestations, as evidenced by the touch or feel; derangements of motion and sensation, involving both the lower extremities and the trunk, with rapid failure of their nutrition; paralysis of the bladder and rectum; and excess or complete loss of appetite. In diseases affecting the upper part of the cord the entire trunk and the arms are affected, and the respiration is disturbed. When the diseases affect the posterior part of the cord the power of co-ordination over the muscles is lost. The minute investigations of other parts of the cord is a branch of medicine in which discoveries are daily made.

Manifestation of diseases.

The spinal cord occupies the upper two thirds of the

Anatomy.

vertebral canal. Its weight is one ounce and a half when denuded of its membranes; above it is continuous with the medulla oblongata, below it terminates in the cauda equina; it is of a flattened cylindrical form. It presents an anterior and a posterior median fissure, and two lateral furrows, from which the anterior and posterior roots of nerve semerge. It is thus divided into an anterior, lateral, and posterior columns. On section it is found to consist of a grey vesicular and white or tubular matter. The grey matter is made up of filaments and cells, and is placed in the centre of the cord. The cord gives offshoots to thirty-one pairs of nerves.

General  
symptoms.

*General character of symptoms of diseases of the spinal cord.*—If in the disease one motor tract be involved hemiplegia would result, but generally the cord is affected more or less on both sides, and hence *paraplegia* is more common than hemiplegia. Other symptoms are peculiar, and associated with special lesions. We know that motor fibres run upwards in the antero-lateral columns, and cross at the pyramids, and the sensory fibres pass to the grey matter and then cross to the other side. Thus, if a cord be diseased longitudinally the sensation will be altogether lost, but a lateral destruction leads to loss of sensation on the opposite side. Injury to the exterior of the cord leads to paralysis of motion only, while if the grey matter be diseased, the sensation will be lost. From the arrangement of the nerve fibres it appears that the exterior is more liable to injury, and the lesion of motion is very common. Thus, in paraplegia and in chronic spinal meningitis motion is first involved. Besides the conducting power the cord has an inherent action of its own. Thus in cases where the cord is severed, the portion below it still retains its excito-motor power, and if the limb be touched it will move. The grey matter has also an influence of a nutritive fluid, and, therefore, if the anterior cornua be diseased wasting of the muscles takes place. If the grey

matter be destroyed altogether, then all the powers are lost. The inflammation or irritation of the *surface of the cord* sets up an excited action in the cord itself, thus, in acute spinal meningitis we have tetanic convulsions, and in chronic, where the local cord is involved, there is additional paralysis and twitching of muscles. In some cases, instead of convulsions, there are severe pains in the limbs and the head is drawn back; very often there may be no pain, although the whole cord may be diseased; in others it is most severe, and the nerves are also involved in the process. Co-ordination is connected with diseases of posterior columns; and the motor powers are affected in various ways in diseases of the anterior and lateral columns. Some of the spinal diseases are primary, while others are altogether of a secondary character. In the primary affection the disease attacks one spot alone or traverses the cord in a plane as to destroy it on one level as if by a knife. This occurs in complete paraplegia, with perfect paralysis of motion and sensation below the seat of disease, without impairment of excito-motor function. It has thus resulted from disease of the cord at one particular spot throughout its whole width, and may be due to caries, or to a tumour or an aneurysm in the canal. Where paralytic symptoms come on slowly and obscurely, the disease is probably in the longitudinal tract and primarily in the nerve-tissues. The symptoms also vary with the seat of injury. Thus, in diseases of the lumbar region there will be paralysis of the legs and of muscles of the abdomen. In disease of the dorsal region and of lower cervical, there will be paralysis of the upper limbs, and if the bulbar portion be involved there will be paralysis of respiration, of deglutition and of speech.



Inflammation  
of the dura  
mater.

## INFLAMMATION OF THE DURA MATER OF THE CORD.

This inflammation may be acute or chronic, but acute inflammation is rare.

Causes.

*Causes.*—Direct injury; caries of the vertebræ; several bedsores; draught of cold air to a part over the spine, especially in rheumatic subjects; adventitious growths; extension from cerebral meningitis, or of erysipelas. Males suffer more than females.

Post-mortem  
appearances.

*Post-mortem appearances.*—The membranes are inflamed; the pia mater thickened, highly vascular, and infiltrated with serum. The exudation on its surface and into the subarachnoid space may be merely turbid or actually purulent. Inflammation may be developed during caries of the vertebræ; the products accumulate between the bones and the dura mater; the vertebral ligament between the bone and the dura mater is eroded or perforated. In cases of bedsores the sacrum and coccyx are exposed and eroded, and their ligaments are destroyed. Where inflammation of the cord is acute and extensive, suppuration takes place, pus escapes along the side of the nerves through intervertebral foramina, forming psoas abscesses. If pus during life is due to pyæmic condition, or if the disease communicates with the external air, the pus is fœtid and dirty-looking. This is most seen in cases of bedsores.

Symptoms.

*Symptoms.*—Fever, restlessness, sleeplessness, severe burning pain along the spine, increased on movement and on pressure. The pain proceeding from the diseased region is shooting into the trunk and legs; spasm of the muscles of the limbs, neck, and back, with startings and jerks, almost simulating opisthotonos, not so severe as in tetanus, the breathing is oppressed and suffocative, deglutition difficult, there is irritability of the bladder, generally loss of motor power, and probably of sensation and of control over the bladder and rectum. Besides these there are head-sym-

ptoms superadded, as delirium, coma, and convulsions. In advanced cases psoas abscess may be detected below Poupart's ligaments. There is also more or less fever. The inflammation often extends to the cord, or results in effusion, and there is paralysis of the lower extremities, varying in extent and intensity, the paralysis gradually extends upwards, and ends in death, or there may be retention of urine, distressing bed-sores about the hips and over the sacrum, with great prostration towards the close. The disease often involves the sensory nerves of the spinal cord, and there are burning pains in the course of some of the nerves. They may affect the shoulders or arms, or sciatic nerves or intercostal nerves. The pains are seldom continuous. The sense of constriction or of a tight band around the chest or abdomen is often complained of. Sometimes herpes and pemphigus also become developed in the course of affected nerves. The cord becomes affected later on. Death takes place from the inflammation extending to the brain, or from compression of the cord by effusion or from myelitis.

*Treatment.*—Locally leeches, fomentation, and application of ice and counter-irritation are useful. The patient must have perfect rest; opium, stimulants, and iodide of potassium are of service.

*Treatment.*

### SPINAL MENINGITIS.

Spinal meningitis is due to spread of inflammation from the dura mater of the cord or the bones of the vertebræ, and involves the pia mater of the cord. It may be idiopathic or secondary to tubercles or hæmorrhagic clots or tumours. Or may be due to injury or to exposure to the sun's rays. The tubercles are found on the inner surface of the dura mater and in the cervical and lumbar regions.

Spinal  
meningitis.

**Symptoms.** *Symptoms* do not vary from those of inflammation of the dura mater already detailed. The disease extends from the dura mater to the pia mater. When a considerable portion of pia mater is diseased the fever is severe and attended with rigors, the pulse is very rapid, there is loss of appetite, and great thirst. The pain in the spinal region is not aggravated by pressure, but on bending or twisting the back; the muscles of the head, neck, and back, are rigid and the head is retracted, and muscles of the face appear twisted. Supervening upon these phenomena we have impairment at first of voluntary motion and sensation, and later on there is difficulty of speech, and the respiration, deglutition, and even mastication are affected.

**Pathognomonic symptoms.** *Pathognomonic symptoms.*—Pain intense along the spine, shooting into the extremities, especially increased on movement; increased sensibility, rigidity, and contraction of voluntary muscles, and want of control over the bladder and rectum.

**Prognosis.** *Prognosis.*—Is a fatal malady, and people die from it in three or four days or in three or four weeks. Death occurs from asphyxia or from asthenia, or from bedsores or complications.

**Treatment.** *Treatment.*—The patient should be kept at perfect rest in a horizontal posture. Keep him clean and dry to avoid bedsores. The condition of the bladder and rectum should be carefully watched, and opium with iodide of potassium may be tried.

### HYDRORACHIS—SPINA BIFIDA.

**Hydrorachis.** Hydrorachis signifies a collection of fluid in the sub-arachnoid space of the spinal cord. When it presses on the cord for some time atrophy results. Most common in children, and is generally congenital. In some cases it is associated with malformation. **Spina bifida.** Spina bifida is a deformity or malformation in connection with the cord, and occurs in

sacral or lumbo-sacral regions, may occur in the neck. It may be due to disunion of arches of the vertebræ or to the absence of the spinous processes of the vertebræ. The cord and its membranes being thus deprived of support protrude, and form a fluctuating tumour of the size of an orange. The tumours are usually depressed in the centre. Its coverings are skin, areolar tissue, and the dura mater.

When the cleft is in the cervical portion there is paresis of the upper extremities, with wasting of the muscles, and the case is fatal in a few days; but when the lumbar or the sacral portion is affected the patient may live for a number of years, and the symptoms will be those of pressure on the grey matter of the cord.

*Prognosis.*—The prognosis is unfavorable, and more so if complicated with hydrocephalus of the brain. There is paralysis of the lower extremities if the tumour continues to enlarge, or if its walls burst; in such cases the patient is unable to retain urine, the sphincter ani is also relaxed, and death is the consequence. Prognosis.

*Treatment.*—Perfect rest, and the less the tumour is interfered with the better. If the fluid rapidly increases, use puncture and pressure; never puncture it along the mesian line, and especially in the sacral region, for, at this part generally, the sac of the tumour and the cord are most adherent. In puncturing, use a needle, for by the lancet you might wound some important structures and vessels. For compression, use air pad, and bandages. Some recommend the application of collodion to the tumour. Others inject into the sac tincture of iodine; but it should be borne in mind that sudden death has often followed such injection. The best is attention to the general health, and change of air. Treatment.

#### SPINAL HÆMORRHAGE.

Spinal  
hæmorrhage.

The blood is extravasated into or around the cord.



## Causes.

*Causes.*—Diseases of the vertebræ; increased blood pressure; diseases of the vessels of the cord; certain conditions of the blood; injuries, as blows and falls; are said to be the most frequent cause of hæmorrhage. Inflammation of the cord or membranes also leads to it. It is secondary to inflammatory softening.

## Symptoms.

*Symptoms.*—Hæmorrhage into or around the spinal cord causes symptoms of pressure. They also depend upon the seat of the effusion, its extent, and the degree of pressure exerted by it. When into the spinal cord, there is loss of motion, but no impairment of sensation. There is sudden and severe localised pain in the back, the patient unconscious for a time, and this is soon followed by an occasional jerking of the limbs and paralysis of motion in the legs, also paralysis of the bladder and rectum and priapism. In partial myelitis or where the hæmorrhage is slow, the paralytic symptoms occur slowly or after a few hours and often end in recovery. In general myelitis or when the blood is effused in large quantity and between the membranes, there is sudden pain in the back, sometimes in the head, soon followed by paraplegia and often by convulsions. In hæmorrhage on the upper part of the cord the heart's action is at once depressed, there is difficulty of respiration, the skin is pale and cold, but there is no loss of consciousness.

## Treatment.

*Treatment.*—The patient is paraplegic and must be kept perfectly quiet mentally and bodily. Some recommend bleeding in such cases. Check further effusion by rest and application of ice to the spine.

## MYELITIS.

## Myelitis.

Myelitis is rare. It is an inflammation of the substance of the cord. The cord or a large tract of it is completely softened or destroyed, its functions are all suspended. I

may be general and affect the whole cord, or partial and restricted to a limited portion.

*Causes.*—Direct injury; caries of the vertebræ; mere sprain or concussion; presence of adventitious growths; hæmorrhages; tumours; extension of inflammation from membranes, or of vertebræ, or of erysipelas from the skin. It is a sequel of pyæmia.

Causus.

*Post-mortem Appearances.*—The same as is found in inflammations of the brain. When myelitis is secondary to diseases of the membranes, the white substance is first affected, then, at a later period, the grey substance. The cord is diffuent, and shows broken-up tissue. In idiopathic cases the grey matter is only the seat of inflammation. The affected cord is much softened and of cream-like consistence, is red at first, but in the advanced stage becomes yellowish. Sometimes clots of blood are seen on its surface. In a few cases abscesses are formed. Under the microscope we find broken-down nerve elements, granules and pus corpuscles.

Post-mortem appearances.

*Symptoms.*—Are those of sudden paraplegia as in spinal meningitis. In idiopathic cases inflammation is primary and affects the grey matter, and hence sensation and motion will both be affected. When myelitis is due to extension from without the white matter of the cord is affected, and therefore motion is more impaired than sensation. The disease has a tendency to diffuse throughout the cord and thus destroy its reflex functions and also the electric contractility of muscles. The affection of spinal grey matter is without pain and therefore myelitis is not a painful disorder. The pain if it exists is due to pressure upon sensory nerves within the canal, or of posterior roots in their passage through white matter. Hence pain may be from existing meningitis or the existence of growths or tumours. Symptoms come on gradually and sometimes suddenly, a patient after exposure to cold or over-fatigue or sleeping over damp

Symptoms.

grass gets rigors but no fever, a feeling as of a rope tightened across the body, tingling and loss of motion and sensation in the legs and arms, or feet and toes. This is followed by sudden loss of motion and sensation in the back and extremities, without tenderness. There is no pain, but only cutaneous hyperæsthesia. The bladder and rectum are paralysed; there is constant priapism, loss of electric contractility and diminution of temperature in the paralysed part. The urine becomes ammoniacal, and bedsores form; if inflammation be high up, respiration is impeded and there may be difficulty of speech. The disease either terminates in death or passes into sclerosis of the cord, and life may be prolonged, although there may be loss of motion and sensation below the diseased portion.

Prognosis.

*Prognosis.*—Acute myelitis is a grave disorder, and patients so attacked die in a few days or a few weeks. The cause of death varies, it may be due to asthenia or apnoea, or to bedsores. Cases often occur where paraplegia may persist for an indefinite period. In rare cases perfect recovery results.

Treatment.

*Treatment.*—Is the same as referred to under the head of spinal meningitis.

Chronic  
inflammation  
of the cord.

#### CHRONIC INFLAMMATION OF THE CORD. SCLEROSIS.

Is characterised as a slow disintegration and softening, or induration or grey degeneration of the cord. The affections are all of inflammatory origin, and are associated with a slow development of adventitious fibroid tissue, leading to thickening of nerve tubules and a greater or less increase of intercellular substance. In advanced cases the sclerosis affects the white substance of the cord, and the tubules now are diminished in thickness, there is partial disappearance of white substance of Schwann, till at last the tubules are atrophied and thus wasted and degenerated. When the sclerosis occupies the grey matter

History.

of the cord, the changes are also noticed in the nerve-cells, which become swollen, granular, and their walls thickened. In some cases the nerve-cells become pigmented and atrophied, and finally, or perhaps wholly disappear. The sclerosis of the cord has a tendency to confine itself to certain tracts or regions. Thus, sclerosis may be limited to the anterior cornua of the grey matter of the cord, or to large nerve-cells within the grey matter, and gives rise to affections known as infantile and adult spinal paralysis, to general spinal paralysis, and to progressive muscular atrophy. The lateral sclerosis is manifested by a sclerotic change in the lateral white columns, which are generally symmetrically affected. Also, cases known as locomotor ataxy are cases of sclerosis involving mainly the posterior white columns; the glosso-labio-laryngeal palsy is a variety of sclerosis where the motor nuclei of medulla oblongata are the seat of sclerosis, while in disseminated sclerosis the change is scattered irregularly throughout the cord and even through the brain.

Symptoms and treatment are fully detailed in sclerotic affections separately.

### MORBID GROWTHS.

Morbid  
growths

These are cancer, tubercles; syphilitic gummata, and sometimes bones or hydatid cysts or aneurysms. Those involving the brain have been observed to affect the cord and its membranes, or the nerves which take their root from the cord.

*Symptoms.*—They are partly due to their mechanical irritation; to their pressure upon the cord, causing its destruction; to local inflammation; and to the involvement of the nerves. They originate in one of three ways. Some grow into the substance of the cord, others take their origin into the meninges of the cord, while a third variety are developed between the bones and the membranes. The first form gives rise to compression and destruction of the

Symptoms.



cord and leads to paraplegia. The paralysis varies as the tumours are situated higher or lower in the cord, or according to the tract they may involve. These tumours generally originate in the grey matter, and hence, when they exist they affect both motion and sensation and are rarely affected with either central or peripheral pain. When they involve one side, or a limited portion of the cord, they induce irregular or cross paralysis; thus, in the early stage we observe motor paralysis on the side of the lesion and sensory paralysis on the opposite side. In advanced cases they produce absolute paraplegia. They also give rise to degenerative changes, to contractions of affected muscles, and to their rapid wasting. The second form involves the roots of either sensory or motor nerves, hence, at first there may be twitchings, followed by paralysis and rapid wasting of muscles. In this variety there may also be agonising pain limited to a certain spot, or the pain may be shooting, and also accompanied by skin eruptions, as herpes, pemphigus. Aneurysms and malignant tumours are a third variety. They involve the motor and sensory nerves in the neighbourhood of their origin, and are hence followed by severe, constant, and increasing pains, increased sensibility of the skin and erythematous eruptions, and rapid wasting and contraction of paralysed muscles.

Diagnosis.

*Diagnosis.*—Presence of tubercles can be ascertained by their presence in other organs, and if paraplegia be present it is more from tubercles than due to caries of the vertebræ. If syphilis be present, and if paraplegia supervene, gummata may be suspected. If, before paralysis sets in, there is a severe pain, it may be due to a tumour in the vertebræ; and if at the same time cancer exists in other parts, malignancy may be suspected; and if the spine also presents an obtuse bend the diagnosis of cancer becomes certain.

Treatment.

*Treatment.*—The same as in tumours in the brain. The pain may be relieved by anodynes hypodermically injected.

## NEUROMA.

*Neuroma* is a term applied to tumours occurring in the course of nerves. It may be a solid fibrous mass, consisting generally of neurilemma and nerve-fibres. When idiopathic they are generally painful growths, and are single. When due to injury, or results after amputations, they involve the extremities of nerves. Neuroma.

## PARALYSIS.

Paralysis is the most prominent of a group of symptoms associated with brain disease. The others are—headache, vertigo, sleeplessness, delirium, &c., but as paralysis is the most striking and unmistakable it requires a somewhat fuller treatment. Paralysis.

In the following pages an arbitrary arrangement has been made with a view to facilitate the reader in the general study of paralysis. I have, therefore, for convenience, treated them in the following conventional order. The paralysis is mainly divided into—1. Cerebral paralysis involving either some portion of the motor tract, or of the co-ordinating power, or some portion of the sensory tract. It may be seated in the peripheral nerves, intracranial nerves, or in the cord. Paralysis as a symptom of cerebral lesion includes general paralysis of the insane, and all the forms of hemiplegia. 2. Paralysis affecting medulla oblongata and pons Varolii includes cross paralysis. 3. Paralysis affecting the spine, as paraplegia. 4. Paralysis involving the nerves at the base of the brain, as local paralysis of the head and neck and of external rectus. They affect the third, fourth, sixth, portio dura of the fifth, and spinal nerves. The sensory paralysis needs no separate division, as it is mainly associated with motor paralysis. 5. Sclerosis of the brain or of the cord, or of both, may give rise also to paralysis. Thus we have infantile spinal paralysis, general spinal paralysis,

Division.

progressive muscular atrophy, lateral sclerosis, tabes dorsales, glosso-labio-laryngeal palsy, or sclerosis of seventh, eighth, and ninth nerves, and insular or disseminated sclerosis. 7. Various kinds of tremors as paralysis agitans, mercurial paralysis, alcoholic tremors, and lead palsy. 8. Local functional paralysis, as writers' cramp and wry neck. Then follow pain in course of nerves, known as neuralgias; and lastly, various kinds of increased movements, as spasms and convulsions.

Definition.

Paralysis or palsy literally means to relax, implies a total or partial loss of either motion or sensation, or of both in one or more or all parts of the body. The loss of motor power may vary from slightest feebleness to the most complete inability to movement. The incomplete loss of motion is often termed paresis; the nearly complete or complete loss paralysis. It is a symptom in nervous diseases and divided into two classes:—*perfect*, which includes cases where both motion and sensibility are diminished or lost; *imperfect*, those in which either motion or sensibility is affected. Imperfect paralysis is further subdivided into motor and sensory paralysis.

### MOTOR PARALYSIS.

Motor  
paralysis  
Definition.

This kind of paralysis is characterised by more or less complete loss of power over the movements of the muscles. Paresis signifies a slighter loss of that power. The paralysis may vary from slight impairment to a complete absence of motion. The quality of paralysis also varies in different cases, thus in paralysis of the insane and in disseminated paralysis, the muscles are tremulous when used; in hemiplegia the movements are weak, slow, but uniform. In some cases the limbs waste, in others they may be flaccid. In another variety the muscles are rigid and perhaps contracted; in some, again, they have lost their electric con-

tractility ; in others, again, the electric contractility may be exalted or retained. In a few cases the electro-sensibility may be likewise altered, either impaired, or exalted. Paralysis may be motor or sensory. The motor is again divided into cerebral, bulbar, spinal, and nerve paralysis. The cerebral arises from diseases situated on the surface of the brain. It may be—1. General paralysis of the insane which is due to general impairment of the surface of the brain. 2. Hemiplegia, which affects any part of either hemispheres of the cerebrum,

*Bulbar paralysis.*—In this disease, the disease is situated within the medulla oblongata or pons Varolii, parts where important nerve nuclei are abundant, and motor and sensory fibres meet and blend, and one-sided limitation of paralysis occurs. Thus we find cross paralysis of one side of the body and of the opposite face, or paralysis of both arms and legs, or one arm and both legs, or one leg and both arms ; or paralysis of one or of both eyeballs, of one or other or both facial nerves ; or there may be paralysis of muscles of voice, speech, mastication, deglutition, or respiration, or of the bladder or rectum. In some cases some of these paralysees are combined together.

Bulbar  
paralysis.

*Spinal paralysis.*—Is a paralysis due to lesion of the spinal cord, and is called paraplegia.

Spinal.

*Nerve paralysis.*—The paralysis is due to lesions occurring below the nuclei of origin of the paralysed nerves or caused by disease involving these nerves. The paralysis is limited in its distribution, may affect a single muscle or a group of muscles. Thus we may have paralysis only of the external rectus of one eye, or of superior oblique, or of muscles of expression, or of the head or neck. This paralysis soon becomes absolute, or the whole of affected nerve becomes implicated, and the paralysis is usually complete. Again, the paralysed muscles do not respond to the electric stimulus, and therefore soon grow flaccid and waste.

Nerve.



Condition of  
muscles.

*Condition of muscles.*—In motor paralysis in some cases they retain their normal tone, in others they become flaccid and waste, in some rigid and contracted. In the cerebral and spinal variety they generally retain their tone, but where the paralysis is sudden and extensive the muscles become flaccid after a time. Where paralysis is due to some irritation or inflammation the muscles become rigid and contracted. As a rule, rigidity is often the consequence of old protracted paralysis or of secondary degenerative changes going on in the lateral columns of the cord.

Effects of  
electricity.

The effects of electricity on muscles is to cause them to contract. The contractility remains unimpaired in some paralysees, in others it becomes exalted, in some diminished or lost altogether. In cerebral and in ordinary spinal paralysis the contractility is retained, and in the spinal variety it is frequently exalted. The loss of contractility is found in paralysis to be due to disease of the nerve nuclei or of the nerves connected with the affected muscles which have long been disused. In consequence of simple disuse, and where atrophic or degenerative changes take place in paralysed muscles, the contractility is impaired or lost in proportion to the amount of injury. Where loss of contractility takes place it is marked and rapid, and occurs within eight or ten days. Two kinds of electricity are in use in these cases, these are Faradization and the direct galvanic current. In the Faradization the currents affect sound and paralysed muscles equally, they are of very short duration, but of high tension and act alternately in opposite directions. In the galvanic current the tension is low and is continuous in one direction only, and when the current is slowly interrupted the galvanic acts more powerfully on the paralysed than on the healthy muscles, and even a feeble constant current responds powerfully where they were irresponsible to Faradization. In those cases where Faradic contractility is

speedily lost or abolished contractility to the continuous current tends to become augmented.

Electric sensibility bears a direct ratio with contractility, unless complete loss of sensibility attends in paralysis. Occasionally, as in hysteria, the contractility remains even though muscular sensibility has disappeared. The nutrition of paralysed muscles is not altered in some cases, only there may be slight change in bulk and texture from long disuse, and hence they take an active action if the cause of paralysis be removed. In those cases the paralysis is situated above the nuclei of origin of the paralysed nerves. In them the tone and Faradic electric contractility is also retained.

Electric  
sensibility.

Where the paralysis is due to lesion of nuclei or nerves emanating from them, rapid emaciation and loss of tone and Faradic electro contractility takes place. In paralysis, involuntary movement due to reflex irritation commonly occurs; thus in spinal paralysis the lesion is in the cord, and it cuts off all connections between the brain and the paralysed limbs, leaving a portion of the cord with which the brain is connected in a healthy condition. In such cases involuntary defæcation and urination occurs, and even by the irritation of bedclothes and tickling the soles the limbs become violently flexed and moved. These reflex phenomena can only arise in those cases where connection between paralysed muscles and the cord is intact. They do not exist where the nerves or nerve nuclei therefore are destroyed.

Like motor paralysis we have another class known as *sensory paralysis*. In it during voluntary efforts the muscles become tremulous and occasionally rigid and contracted; often attended with hyperæsthesia where the sensibility may be increased or perverted; with anæsthesia or impairment or loss of sensation; with convulsions or spasms.

Sensory  
paralysis.

*Anæsthesia* may be limited to the skin or to muscles or to both. When slight it is attended with numbness, formications or tingling, and the sufferer feels on contact with

any object as if the affected part is covered by a thick soft padding. Thus, in ataxy, if the feet touch the ground they feel as if they are walking on cotton wool. Where the disease is extensive the patient is not aware if the feet be pricked or burnt ; he is also incapable to distinguish painful impressions of heat and cold. In hysteria the muscular sensibility is sometimes impaired, while that of the skin continues normal. Like motor paralysis the anæsthesia may be cerebral, bulbar, spinal, and affecting nerves.

Cerebral.

*Cerebral anæsthesia* may be general impairment of sensibility, as in general paralysis of the insane, and may be local as in disease of one of the cerebral hemispheres or of the ganglia or crus connected with it. It is said to be common in diseases affecting optic thalamus and the white substance. It may be absolute and the patient feels nothing. The anæsthesia may be more or less complete and general, or only affecting patches, as palms, or soles, or both.

Bulbar.

*Bulbar anæsthesia* is also associated with motor paralysis, and is of irregular distribution. *Spinal anæsthesia* associated with spinal paralysis. The *nerve anæsthesia*, like the local paralysis, affects the sensory nerve or its nucleus, and thus affects the same or the diseased side. It is absolute and runs along the distribution of nerves. The augmented sensibility or hyperæsthesia and perverted sensibility or dyæsthesia are both combined in practice. In these cases the eyes cannot bear bright light or the ear high notes. It is common with hysterics, sometimes in the early stage of fevers, and occasionally in inflammatory affections of the cranium. The perverted sensations or dyæsthesia indicate an advance of anæsthesia, namely, numbness, tingling, formications, or the stabbing, shooting, and boring pains. True neuralgic pains, as of angina pectoris, colic and others, are of a shooting character, occur in paroxysms, and follow one another in rapid

Dyæsthesia.

succession. There are some neuralgias which affect the viscera and others which influence special nerves.

The sympathetic system has a large relation with these morbid changes. This is best known by contraction of bronchial tubes in asthma, of the vessels in angina pectoris, and of the anæmia of the brain in epilepsy. We also know of dilatations of vessels in inflammation and also in diabetes. The contractions cause less blood to reach the tissues, whose nutrition and functional activity become diminished. In cases of dilatation, the tissues become hyperæmic and their functions stimulated to increased activity. Thus it regulates nutrition in health and disease.

Sympathetic system.

*Influence of nervous diseases over nutrition of the body.*—

The cerebro-spinal system is the seat of lesions of certain affections of muscles, of joints, of the skin and subjacent tissues, and certain affections of kidneys and bladder.

*Muscles.*—In motor paralysis where the muscles may be healthy in tone or contractility for months or years, or may undergo wasting from mere disease or from some atrophic changes, or the muscles may rapidly lose Faradic electric contractility and become wasted. This occurs in lesions of motor nerves, or of the cord or of the brain.

Muscles.

*Joints.*—Where the joints become affected, the disease is limited to the paralysed limbs and is associated with rapid atrophy, and the affection is due to the same causes which cause muscular lesion. In paraplegia from injury to the spine the knee becomes affected, in hemiplegia due to softening, the joints of the upper extremities, in locomotor ataxy the knees, elbows, or shoulders are affected, and attended with effusions into the joints.

Joints.

*Skin.*—The total abolition of sensation, the inflammation, ulceration, and even gangrene of the skin in paraplegia is apt to occur. This is said to be due to the loss of tactile sensation which prevents the patient from recognising the

Skin.



presence of irritants and other influences, and so from avoiding their operations. Hence the bedsores are most common. Cases are known where irritation of sensory nerves is attended with neuralgia and is followed by erythema of the skin, with redness which may even proceed to vesication or pustulation. Herpes or zona is an example of this nature. The anæsthetic leprosy which leads at first to overgrowth of cells in the course of nerves, their subsequent destruction and consequent anæsthesia, is another example. If unchecked it goes on to motor paralysis and also to atrophic changes in the muscles and to erythema of the skin.

Bedsore.

The bedsores which occur in paralysis are the most interesting of cutaneous lesions. They may be due to constant pressure to which these parts are exposed, and to the effects of the patient's secretions which collect there. In some cases, however, even with the best attention, bedsores occur, and with extreme rapidity in three or four days from the beginning of the attack; they commence as erythematous patches with inflammation and congestion of subjacent tissues. Shortly vesicles or bullæ appear on them, and a superficial slough forms. They are common in hemiplegia and in paraplegia. In these cases the posterior cornua of the grey matter of the cord are the seat of lesion as the anterior cornua are for the atrophic changes in muscle and viscera. In paraplegia owing to the constant retention of urine and the irritation of the mucous membrane of the bladder from its accumulation and decomposition, inflammation of the bladder occurs. The inflammation often extends upwards, and gives rise to suppurative nephritis.

Various clinical points need always to be determined in every case of paralysis. Thus, its mode of onset, whether sudden or gradual; the seat and extent of its distribution, whether it is temporary or persistent; its progress, whether favorable or otherwise; whether the paralysed muscles are

flaccid or rigid. In persistent paralysis we generally find imperfect nutrition of the paralysed tissues, which are therefore soft and flabby, or wasted or thin, dry and scurfy. There is feebleness of the circulation, as known by small and weak pulse, pale skin, and low temperature, and œdema, with extraordinary growth of hairs.

### GENERAL PARALYSIS.

General paralysis is a chronic inflammatory process in the brain, in which the cerebro-spinal centres are all wasted. It is a paralysis of body and mind. The patient lies in bed perfectly helpless, his mind gone. The disease progresses slowly, the membranes and the cortical portions of the brain are first affected, and we frequently have epileptiform convulsions. It is not a mere degenerative disease, for the destruction is due to an active process. Its mental peculiarities are exalted ideas of wealth or personal importance.

General  
paralysis.

General paralysis is a cerebral motor paralysis, supposed to be due to general impairment of the surface of the brain. It is always associated with some form of mental derangement. Paralysis begins at one part, which gradually advancing sooner or later affects nearly every muscle of the body. Thus, there is complete loss of motion and sensation of the whole body, ending in death.

*Causes.*—The cause of general paralysis of the insane is much disputed. One author attributes it to the adulteration of beer by *cocculus indicus*, and supports his assertion by the observation that in Ireland, where beer is but little drunk, general paralysis is unknown. Another writer attributes the disease to sexual excesses. All, however, admit that continued mental anxiety in a person of excitable temperament precedes its commencement in a large number of cases. In all probability it does not

Causes.

depend on any one solitary cause. It is much commoner in most districts in men than in women, but in the town of Leicester, where the shoe trade places women at an early age in as independent a position as men, the disease, which is frequent, occurs equally in the two sexes. This fact seems to support the theory that mental anxiety has relation to the disease. It is rare before thirty and after forty. Other causes are disasters, money speculations, and fast living.

Post-mortem  
appearances.

*Post-mortem appearances.*—A variety of post-mortem appearances is found in cases of general paralysis; the most constant are cerebritis, and degeneration, and destruction, or a partial or general sclerotic condition of the cerebral hemispheres. The membranes are thick and firmly adherent to the surface. Sometimes extravasations of blood are found, and amylaceous bodies.

Symptoms.

*Symptoms.*—The disease sets in with unaccountable alteration in the manners and character of the patient. and this aberration of mind is the first symptom. This is followed by progressive paralysis. The paralysis at first is slight in degree, and begins in the tongue and lips, as indicated by tremors and feebleness of the muscles, and by defective and blurred articulation; next, it affects the muscles of the face, giving the face a sad and blunt look. There is an altered mode of speech, and inability to hold saliva; the tongue is protruded with difficulty, or quavers. There is an appearance of a drunken man. Then follows weakness in the limbs, the gait becomes unsteady, and the patient staggers; the handwriting becomes irregular and tremulous; there is inability to swallow, and food may pass into the larynx. The pupils are unequal, both contracted more than natural. The physical powers are diminished, and the patient cannot walk or stand or sit, and is confined to bed. There is an involuntary passage of urine and fæces. The paralysis

now extends to the head, neck, and trunk, and ends in death, which is most often due to intercurrent pneumonia. Co-ordinately with these physical symptoms, occur mental derangements of a uniform character; these are sometimes the first symptoms of the disease and continue to its close. The patient has exalted delusions as to his wealth and personal importance. A labourer has £30,000 a year and a shoemaker believes himself an earl. A further and very characteristic mental symptom is, that however much the paralysis may have advanced, the patient believes himself to be in perfect health.

*Duration.*—A case of general paralysis is seldom protracted beyond two years, and then ends fatally. Duration.

*Treatment.*—The treatment is palliative. The patient must not be allowed to be the victim of his delusions. He must have proper exercise and nourishing diet. Where syphilis exists iodide of potassium may be given. Treatment.

### HEMIPLEGIA.

A perfect hemiplegia is a disease or temporary impairment of the functions of the complete half of the spinal cord or of motor centres of half of the body. Hemiplegia exists in various forms. Hysterical hemiplegia is a functional disorder, and is not due to any disease of the cord or of the central ganglia. Hemiplegia.

It denotes paralysis of motion and sensation of one half of the body. It is also known as paralytic stroke, and is usually the result of an apoplectic fit.

*Causes.*—Disease of some portion of the motor tract; mischief affecting any part of either of the hemispheres of the cerebrum, may cause paralysis of the opposite side of the body owing to the decussation of the fibres of the pyramids. Cerebral hæmorrhage, external to the dura mater, from injury to the middle meningeal artery, embolism, or thrombosis of the cerebral arteries; the pre- Causes.



sence of foreign bodies, as inflammatory exudations or hæmorrhagic clot, or a tumour in the brain lead to temporary hemiplegia. It may be a functional disorder, and may be associated with epilepsy, chorea, hysteria, and even parturition. In a few cases injury to or disease of the spine produces hemiplegia on the same side, and all the parts below are paralysed.

Pathology.

*Pathology.*—The *corpus striatum*, and the white substance in its neighbourhood, are most commonly affected, and with it if the posterior fibres of the *left third frontal convolutions* are affected, hemiplegia with defective speech results. Hemiplegia affects the opposite side of the body to the brain mischief, but not all parts of it equally. The lower part of the *seventh* and the *ninth* are also affected. Hence there is paralysis of the arms and legs, of the face in part, and of the tongue. The motor nerves at the base of the brain take origin from before backwards, and are comparatively little affected. Thus the third, fourth, and sixth are rarely affected, and hence the motions of the eye ball are unimpaired. The *portio dura* is generally but slightly implicated. Thus we find the paralysis of the face, which looks blank, with its wrinkles effaced, the mouth drawn to the sound side, the eye cannot be perfectly closed, the cheeks hang loosely, the angle of the mouth slightly drawn upwards and to the sound side; the muscles of mastication and of lingual sensation are weak, and do not act properly; the tongue is pushed over on protrusion to the paralysed side. There is still some movement in the upper half of the face. The third nerve is usually affected, causing ptosis, external squint, dilated pupils and diplopia. The ninth nerve is always markedly involved, and the tongue is drawn towards the affected side when protruded. The spinal nerves going to the head, trunk, and neck, are but slightly affected, and hence the patient can keep the head erect. The motor fibres

of the par vagum suffer little, and hence deglutition is not affected. The parts under voluntary control only are affected, and hence the respiration and muscles of the abdomen and chest are not affected, and the patient could turn the head. Thus in hemiplegia the parts involved are those over which we have control. The face, tongue, and limbs are affected, while the body is left free. This is owing to the decussation of the fibres. A small spot of disease in the motor ganglia will produce paralysis of the limbs on the opposite side, a slight lesion partial, and a severe lesion complete paralysis, but not paralysis of a particular muscle according to the exact site of the lesion. As a rule the left side is more often affected than the right, and the muscles of the arms and legs are always chiefly involved. In severe cases they are both paralysed, but if any difference is noticed among them it is that the arm suffers more than the leg, that the leg is the last to be diseased and the first to recover. The explanation of this phenomenon is merely hypothetical. When hemiplegia occurs on the right side it is generally associated with aphasia, and language or use of words is lost, owing to the implication of the third frontal convolutions; in paralysis of this side motion is more affected than sensation.

The paralysis may be complete or incomplete; the parts affected may be flaccid and moveable, or rigid; there may or may not be loss of sensation. It may come on suddenly, almost always, but not always, and with loss of consciousness, or gradually. It may begin with the face, and extend to the arm and leg. In hemiplegia, in complete cases, the memory is weak, and the patient often sheds tears. Hemiplegia may be attended with rigidity which may come on early or late. Where early rigidity is noticed it is probably from a clot. Late rigidity is due to an atrophic state of muscles. It may also be attended with relaxation. When marked it is certainly due to white softening or

atrophy from thrombosis or embolism of the cerebral vessels with or without a clot.

Symptoms.

*Symptoms.*—In hemiplegia due to hæmorrhage, the onset is sudden, the patient on awaking in the morning complains of pain on one side of the head, and of confusion of intellect, which is followed by vomiting. He is suddenly speechless, and the face is paralysed. The mouth drops, but not the eye, owing to the seventh pair of nerves not being completely paralysed. The falling of the face is due to paralysis of the facial nerve, and not the buccal nerve from the fifth which is altogether sensory. When the paralysis is on the left side the head is forcibly turned away from the paralysed side, and the eyes are also turned upwards and to the right. This deviation is accounted for by the fact that the healthy motor centre being no longer counterbalanced by the other. Where such a deviation occurs it always shows that the mischief is very severe, although there is no loss of consciousness. When due to cerebral embolism there is only sudden loss of motion without loss of consciousness or sensation. Hemiplegia occurs from lesions lower down the motor tract, and implicating special cranial nerves. In such cases hemiplegia is associated with paralysis of special nerves. In disease of the pons we find paralysis of the fifth, sixth, and seventh. In disease of the motor ganglia the facial nerve is slightly affected, but in that of the pons varolii the facial is paralysed. This could be explained by the circumstance that the fibres of the seventh cross in the pons. In lesion *lower down in the pons*, the centre of the seventh nerve of that side will escape, but the fibres crossing over from the opposite nerve will be implicated, and thus there will be paralysis of the limbs of one side, and of the face of the other. In cases of lesion of the *middle of the pons*, where both motor tracts are involved general paralysis results. Such cases are often mistaken for coma or where voluntary power is for

Seat of lesion  
in hemiplegia.

a time suspended as in stupor. In lesion of the *anterior cerebral lobe* the hemiplegia is associated with loss of sense of smell and the paralysis is on the opposite side of the lesion. The lesion of the *posterior lobe* causes loss of sight with hemiplegia of the opposite side. In diseases of the corpora quadrigemina, which is the chief tract for the sense of sight, blindness results. The posterior lobes and the *corpora quadrigemina* are supplied by the posterior cerebral artery, so that any obstruction either from embolus or thrombosis to this artery will cause anæmia or morbid condition of these centres. The lesion of the *cortical grey matter* gives rise to headache, loss of consciousness, delirium, convulsions, and partial loss of motion, but no complete paralysis. The lesion of the *crus cerebri* causes paralysis of the face and arm, rarely of the leg, and the loss of sensation is more complete and persistent than in hemiplegia where the corpus striatum and optic thalamus are diseased. In lesion of the *crus cerebri* only involving the third nerve, there is paralysis of the face and limbs on the opposite side, and of the muscles of the same eye supplied by the third nerve. This kind of paralysis is called cross paralysis.

Thus the hæmorrhage may affect the pons, and may be confined to its upper central or to its lower part. It implicates other nerves, as the fifth, sixth, and seventh, and cross paralysis in its various forms is a result. Where the central part of the pons is damaged by a clot it is extremely difficult to diagnose, and both motor tracts being involved we find hemiplegia with insensibility over a large surface. In hæmorrhage into the lower half of the pons there will be alternate hemiplegia, with paralysis of motion on one side and of sensation on the other. In effusion into the seventh nerve and to the upper half of one side of the pons, there is hemiplegia with complete paralysis of the face (in disease of the ganglia the face is only slightly paralysed),



sometimes on the same side and sometimes on the other owing to the fibres of the seventh crossing the pons. If the clot be near the root of the fifth nerve, there will be hemiplegia on one side and facial anæsthesia on the other. If the lesion involves the portio dura or lower half of pons, the centre of the seventh on that side will escape, but the fibres crossing over from the opposite nerve would be involved, and there will be paralysis of the limbs on one side and of the face on the other. In lesion of the *medulla* there will be paralysis of the tongue, with impairment of articulation, and paralysis of the limbs; this lesion is rapidly fatal, because the centres of respiration and deglutition are there placed. Lesion of the *corpus striatum* is more frequent than that of the optic thalamus or any other part of the brain, owing to its being richly supplied by blood vessels. In this lesion motor paralysis is more marked than in lesion of the optic thalamus; and sensory paralysis is less marked.

Diagnosis.

*Diagnosis.*—The chief point is the determination of the cause. Complete sudden coma when the attack began, especially if there be albumen in the urine, and the signs of cardiac hypertrophy indicate hæmorrhage. A cardiac murmur with less complete coma in the seizure, points to embolus. Tumours may be inferred when the two commoner causes seem improbable.

Prognosis.

*Prognosis* depends upon the cause. If apoplexy precedes the attack a brain lesion is certain to exist, and the prognosis as to complete recovery is unfavorable. Improvement is generally partial; renewed attacks are common. In cases of recovery from hemiplegia improvement is first noticed in the leg. In unfavorable cases, the affected limbs waste, become atrophied, and their temperature becomes diminished. Hemiplegia due to hysteria ends in recovery.

Treatment.

*Treatment.*—After the treatment already detailed for

the seizure under the heading “Apoplexy,” order rest of mind and body. Forbid all business transactions, but allow gentle exercise, and carefully regulate the diet. Counter-irritation to the spine by dry cupping, or frictions of brandy and pepper, as used in India, to the neck, and to paralysed limbs, or stimulating liniments are useful.

## APHASIA.

Aphasia.

A common symptom in hemiplegia of the right side. Definition. Aphasia signifies impairment or loss of power of speech. The power of co-ordinating words or ideas is what is lost. The mind is sound, and so are the organs of articulation. The connecting link is broken.

The word aphasia has been used to designate all difficulties connected with the failure of the link between ideas and their expression, whether aphemia or agraphia, or both combined. The power of speaking is disordered, but there is perfect comprehension of words spoken by others, of writing which he sees, and of his own errors of expression. The idea is formed, but the appropriate words seem beyond his reach. There is only a rupture between the formation of ideas in the brain and their expression.

A patient with aphasia can sometimes write without mistake, but more often the defect of co-ordination is as manifest in written as in spoken composition. Agraphia is then said to exist. Agraphia.

*Causes.*—Portions of articulate speech may be divided Causes. into four classes—(a) The motor nerves are paralysed, and there is inability to use these organs; (b) the co-ordinating centre to nerve origins or movements of speech is affected, and although patients have complete control over movements of lips and tongue they cannot articulate sound or cause organs of speech to execute their combined movements; (c) the portion of the brain where words are trans-

formed into ideas, and thoughts, and acts is diseased, and thus there is loss of memory of words and other mental attributes; this class is known as amnesia. (*d*) Where both the co-ordinating centre of nerve origins of speech and the portion of the brain, where words are transformed into thoughts and acts, are affected.

Varieties.

*Varieties.*—All these peculiarities vary in degree, and any or all of the above abnormalities may exist in an individual case. There is loss of memory, of words, of reasoning, and of concentration of thoughts. Many cases are recorded where the patients have with every other intelligence acquitted themselves very creditably at games where skill, quickness in movements, quickness of perception, and the use of their senses were required.

In many cases there are superadded other forms of sensory, motor, or mental derangements. Thus, in such cases there is occasional misuse of certain words, or omission of certain words in writing or speaking, or addition of wrong beginnings or endings to words, or transposition of syllables or letters. In some cases, again, the patient whenever he makes an attempt to speak only utters a word or two, or only repeats words which are dictated to him; in other cases, again, he gives loud utterances to words which are also indistinct.

Another class includes cases of aphemia and amnesia combined, or aphemia, amnesia, and paralysis of organs of speech. In these cases, which are by far the most numerous, the patient after an attack of right hemiplegia absolutely loses power of speech, or only utters one or two inarticulate words, or has paralysis of lips and tongue; he apparently understands everything, and even points out words on a printed book correctly as in aphemia. Gradually or suddenly he could articulate words, but has forgotten the names of things, and is then found to be suffering from aphemia and amnesia combined.

*Pathology.*—Talking or ordinary conversation implies three distinct things—voice, articulation, and speech. The *voice* is a sound produced by the larynx, and hence aphonia or loss of voice is due to defect or paralysis of the larynx. *Articulation* implies words which express our thoughts, and flow themselves without any attention being paid to their utterance by the movements of our lips, tongue, and palate. *Speech* consists in the perfect production of elementary articulate sounds and in the sound expression of ideas, and has its source in that part of the brain in which ideas are transformed into words and revived into thoughts and acts. For perfect speech there must be soundness of the cortex of the brain, which is the seat of intellect; of the nerve fibres going from the corvex to the bulb, which are the conductors of the will; of the bulb, and the nuclei of the nerves which supply the muscles of speech; of the nerves; and of the muscles themselves. The impression of thoughts and acts is then transmitted through a co-ordinating centre to the nerve origins of speech. This co-ordinating centre is said to be in the third frontal convolution over the corpus striatum, and this centre on receipt of the impression of thoughts and acts regulates or combines groups of movements, and causes the organs of speech to execute these combined movements. In all these cases there is hemiplegia of the right side, with lesion of the left cerebral hemisphere occupying the corpus striatum, the island of Reil, and some neighbouring convolutions (the posterior third of the third frontal convolution, called Broca's convolution, is nearly always affected), these nerve centres being supplied by the middle cerebral artery, the commonest seat of embolism, and hence aphasia almost always occurs after a seizure due to embolus.

*Symptoms.*—The defect of speech may be the result of motor paralysis of the nerves of the organs of speech and



may occur in cases of *right or left hemiplegia, general paralysis of the insane, general spinal paralysis, locomotor ataxy, insular sclerosis, chorea, and glosso-labio-laryngeal palsy*. In left hemiplegia and in glosso-labio paralysis the defect of speech is extremely slight. In general paralysis there is tremulousness of lips and tongue, and the utterance is imperfect. In locomotor ataxy and in insular sclerosis the utterance is slow and tremulous; there is stammering; shows a change in the medulla, and is often attended with efforts on the part of the tongue and lips; the syllables are divided, and there is tendency to scan the sentences. In glosso-labio paralysis there is paralysis of the lips, tongue, and soft palate; there is loss of power of articulation, of retaining saliva in the mouth, and of swallowing.

Three  
classes.  
First.

Second.

Third.

A patient recovering from unconsciousness is found to be speechless, although every other faculty is regained. He can hear the speech, understand everything said or read, converse by means of writing, and use his lips and tongue for every other purpose except for speech. Where he can speak but cannot write, the term *agraphia* would be used. In these cases the faculty of language is not entirely lost, the patient can think with the aid of words, he can express his ideas by writing, but he cannot give utterance to them. The failure of articulation does not reside in the paralysis of the muscles of articulation, but the co-ordinating centre to movements of speech is interfered with. The automatic flow of words from our lips without any attention being paid to their movements as is common in ordinary conversation, fails in these cases. The third class includes *amnesic aphasia* or cases where there is loss of memory, the patient with perfect power of utterance is unable to converse, with perfect vision he is unable to read to himself or to others, and with perfect use of hand or arm he cannot write or make himself understood by writing. He has forgotten words, is unable to recall facts,

and is incapable of pursuing any train of reasoning. In some cases the patient attempts to speak, perhaps utters a word or two correctly, and then stumbles a little or stops. He seems to understand everything that is said to him, and for the moment he can articulate every word which is dictated to him. It is curious enough that the words heard are by a voluntary effort reproduced by the organs of speech, and recall for the moment to his mind the ideas which properly attach to them. In the same way he could convey written words to his mind through his eyes although he cannot utter them. He cannot name the letters nor point them out if named to him. The same difficulty is noticed about him in writing. He can write from a copy, but when he tries to write he makes a series of up and down strokes. Manifesting a dim recollection of the art of writing, he often writes a letter or two, and then passes on to unmeaning strokes. In writing there is close sympathy between the eye and the hands, he sees the printed copy, and by an effort of the will reproduces it automatically in writing, yet he does not understand what he sees or what he writes himself.

An example may help to elucidate the precise nature of aphasia. An officer with aortic disease had an apoplectic seizure, and continued aphasic after he had recovered to a great extent the use of his paralysed side, and he only recollected three words. These he used as a sort of formulæ. Thus, he had served through the war in the Peninsula, and had lived a great deal abroad. Whenever he wished to allude to this time of his life he used the word *Sea*. He spoke, or he had been able to speak Portuguese, and when aphasic, retained perfect understanding of that and three other languages, though only able to utter three words and those English. He was one day walking with some members of his family, and they were talking about a friend in Portugal. He listened attentively. They could not

Example of  
aphasia.

recollect the name of one of the people spoken of. He seemed to recollect, but could express nothing. As they walked on they passed an old iron pot; he stopped and pointed to it with his stick. His sister did not understand at first what he meant; then she guessed that it had something to do with the name, and asked him if it had. He nodded assent. She tried all sorts of English words suggested by the broken vessel, he shook his head at all, and said *Sea*. By this she guessed that he meant something in Portuguese, which she also spoke, and said *Caldero*, the word for a pot. He nodded assent, and she recollected that Caldero was the surname they had been unable to call to mind.

**Prognosis.**

*Prognosis.*—Some cases of aphasia do not improve at all. those that get quite well usually do so in the first month. Others manifest very slight improvement indeed. Cases do not usually get worse unless there is a second seizure.

**Hysterical hemiplegia.**

*Hysterical hemiplegia* is a paralysis of one side, and there is temporary loss of voluntary motion of one side of the body. In it there is no absolute failing of the muscles of one side of the face, the speech is not thick, and the patient can open the mouth, or can open his eyes at will. The limbs are not absolutely paralysed, when moved some sort of resistance is offered, but are not entirely powerless.

**Hemianæsthesia.**

*Hemianæsthesia* signifies disease of the optic thalamus, producing loss of sensation in half of the body. In hemiplegia there is generally no loss of sensation; in rare cases the sensation is impaired, and is seldom completely lost. In many cases the loss of sensation is due to functional disorders, and is generally associated with loss of special senses. When sensation is lost, and due to organic lesion, the lesion is extensive, and implicates the whole hemisphere. Limited anæsthesia may be due to disease of the outer side of the thalamus, involving some of the fibres of the corona radiata. Some physiologists assert that in disease

of the thalamus sensation is destroyed on the opposite side, and the limbs do not respond to electricity as in ordinary hemiplegia, and the common sensibility and the reflex excitability are lost. The question is still doubtful, and those who are against the view of locating the thalamus as the seat of sensation assign the upper and posterior strata of the pons, midway between the lateral border and the middle line, as the seat of anæsthesia.

### CROSS PARALYSIS.

A very rare disease, and is due to lesions within the medulla oblongata or the pons Varolii. These centres are the tracts where several important nerve nuclei, and also the motor and sensory fibres from both cerebral hemispheres, meet and blend. In such cases there is paralysis of both arms and legs, or of one arm and both legs, or the converse. Very often to this kind of paralysis is super-added paralysis of the third, fourth, and sixth, nerve of portio dura, and of hypoglossal nerve, hence we find affections of the eyeballs, difficulty of speech, of deglutition, mastication, or of respiration. The patient also loses control over the voluntary muscles, and the bladder and rectum discharge their contents involuntarily. In this paralysis we have disease involving nerve tissue at the base of the brain, above the nerve nuclei giving rise to hemiplegia, and also direct implication of nerve nuclei, or of nerves after their emergence from the nuclei. The latter lesions are apt to lead to paralysis of the same side. Thus, cross paralysis results.

Cross paralysis.

*Diagnosis.*—Cross paralysis is sometimes erroneously inferred in cases where facial paralysis has preceded an attack of hemiplegia. The patient or his friends, in a supposed case of cross paralysis, should always be questioned as to the existence of any previous facial lesion.

Diagnosis.



**Prognosis.** *Prognosis.*—Is generally unfavorable, as deglutition, respiration, and circulation, are soon affected by paralysis ; but all cases do not die.

**Symptoms.** *Symptoms.* The *symptoms* and *treatment* of cross paralysis do not differ in any way from those of hemiplegia.

**Paraplegia.**

### PARAPLEGIA.

**Definition.** The term paraplegia includes a group of symptoms due to disease of the spinal cord; and is characterised by the fact that paralysis is only limited to the muscles supplied by nerves given off at the cord, at or below the seat of lesion. It is a paralysis of all parts of the body below the seat of lesion.

**Causes.** *Causes.*—It may be a purely functional disorder ; may be due to direct injury or wound ; to caries of the vertebræ ; to adventitious growths pressing on the cord ; to congestion ; compression ; to inflammation of the cord or its membranes ; or to hæmorrhages into the cord, with or without any cerebral complication. Hysteria and similar reflex causes as teething, worms, uterine diseases or exposure to cold may produce paraplegia.

**Symptoms.** *Symptoms* may come on gradually or suddenly. When gradual they begin with weakness, numbness, and formications of the feet and legs, and pain in the back, often the gait is unsteady, feet dragging, and the patient stumbles while walking. The effort which the paralytic patient makes in walking is different from weakness of the legs from hysterical paralysis or from rheumatism. In the former there is want of power, in the latter there is want of knowledge of the position of the foot. In the case of diseased cord the bladder is also paralysed. There is lessening or loss of motion in the lower limbs, and the muscles are either relaxed or rigidly contracted. There is also paralysis of the bladder, and retention takes place

owing to the loss of sensibility or stimulus to excite its contraction. Where the sensibility is lost, and the urine becomes alkaline in a few days, the dribbling is noticed. Later in the disease there is paralysis of the rectum; other organs, as the stomach, also suffer from defective nervous influence. The patient is often obliged to keep in the horizontal posture, and becomes bedridden. Owing to change in nutrition bedsores form on the hips and sacrum, the urine collects in the bladder and becomes fœtid, ropy, and alkaline, very often cystitis is set up, or the irritation may extend to the kidney, and suppurative nephritis may result, and the case ends in death. The symptoms vary with the seat and extent of the lesion. In lesion of the whole thickness of the cord in the neck, above the phrenic nerves, there will be complete paralysis of the arms and legs, and of the diaphragm and other respiratory muscles; if below the phrenic nerve, the diaphragm will escape. In lesion of the cord in the dorsal region the arms escape, and there will be paralysis of the lower extremities and of those muscles of the trunk which are supplied by nerves below the seat of lesion. In this paralysis the voluntary control over micturition and defæcation always suffers. If the lesion be situated in the cervical or upper part of the dorsal region, the sphincters will be spasmodically contracted, and there will be difficulty of passing water without much straining; but if disease be seated in the lower dorsal or lumbar regions there will be paralysis of the sphincters, and the bladder will be full, and the urine will dribble away spontaneously.

Symptoms  
vary with  
seat and ex-  
tent of lesion.

In lesions limited to a portion of the cord throughout its length or breadth, the paralysis is not complete. Thus, in paralysis due to foreign bodies pressing upon the cord or to diseases of the parts surrounding it, or to disease of its surface, the motion is completely lost, while sensation remains perfect. In lesions affecting one lateral tract

there will be motor paralysis of the muscles, supplied by nerves issuing from the tract, and the paralysis will be on the same side, but as the sensory nerves decussate in the cord, there will be loss of sensation in the corresponding muscles of the opposite side. Certain paralyses have a tendency to implicate certain tracts or portions of the cord and is only limited to them. We have implications of posterior columns, lateral columns, and large motor nuclei in the anterior cornua. In locomotor ataxy the posterior columns only are affected and thus there is a loss of co-ordinating power of the voluntary muscles below the diseased cord. In disease of the lateral columns, motor paralysis in parts below the seat of lesion ensues. The paralysed muscles are tremulous and ultimately become rigid and contracted. The pupils are often affected in spinal disease owing to the influence of the sympathetic nerves in the neck.

Diagnosis.

*Diagnosis.*—Locomotor ataxy and paraplegia may be confounded. The differential diagnosis will be found under the former head.

Treatment.

*Treatment.*—The cause must be first looked for and removed. If due to disease of the cord which contracts the nutrient vessels of the cord or its membranes, ergot of rye and belladonna will be useful. Sleep may be restored by an anodyne. Opium should not be used, as it promotes congestion. Strychnia and other tonics are useful, as they improve the quality of blood and give tone to the vessels of the cord; they should be used after the irritation or inflammation of the cord has subsided. The patient is generally bedridden, and therefore try sinapisms and liniments as counter-irritant applications. The diet should be nutritious.

Local  
paralysis.

#### LOCAL OR SPECIAL PARALYSIS.

Definition.

Local paralysis may mark the commencement of brain disease, but in most cases the cause is peripheral; thus,

destruction of a nerve from injury, pressure upon it of a tumour, aneurysm, or mere temporary compression as from hanging the arm on a chair, or changes in the nerve itself (inflammatory or otherwise), exposure to cold, syphilis, gout, or rheumatism, or introduction of certain poisons into the system, lead to it. It is often a sequel of diphtheria.

Paralysis is due to affections in connection with diseases of nuclei of nerves or with nerves after their emergence from their nuclei. Such paralysis is generally limited to a single muscle or to a group of muscles. The paralysis may affect only the external rectus of the eye or other muscles only, or the muscles of one side of the face, or only certain muscles of the head or limbs, or of the trunk. In this affection the paralysis is always general and complete, and the muscles do not respond to the electrical stimulus, and then also soon grow flaccid and waste. Such paralysis is classed under the group of local paralysis. These are paralyzes of the third, fourth, and sixth or oculo-motor nerves, of the fifth nerve, of the portio dura, and paralysis of the spinal nerves. Pathology

### PARALYSIS OF THIRD, FOURTH, AND SIXTH NERVES

Is due to lesion, either at their origin or in some part of their course. Thus, syphilis which generally affects the base of the brain, (where these nerve-trunks are situated,) foreign bodies, as tubercles, tumours, aneurysms, exudation products in these situations by causing pressure on them, lead to paralysis. It is worth remembering that this kind of paralysis is often associated with locomotor ataxy. Very often exposure to cold or presence of rheumatism or reflex causes leads to it.

*Symptoms.*—The paralysis can be best understood by recalling to mind the position of the nerves at their origin and in the various parts of their course. Thus, the Paralysis of the third, fourth, and sixth nerves.  
Definition.  
  
Symptoms.



third and fourth nerves take their root in the floor of the iter ; the portio dura and the sixth in the floor of the fourth ventricle. These nerves, third, fourth, and sixth, supply motor influences to the muscles of the eyeball, the fourth to the superior oblique, the sixth to the external rectus, and the third to the rest of the recti, and also the inferior oblique, and to levator palpebræ superioris.

The paralysis of these nerves is attended with squinting and double vision. Generally two or three muscles are involved in paralysis, except in the cases of the external rectus, where a single muscle is paralysed without affecting any other. The paralysis of the third pair causes ptosis, and also dilatation with immobility or dilatation alone of the pupils. There is also present external strabismus and difficulty in adapting the eye to vision at different distances.

Treatment.

*Treatment.*—As the disease is curable, attempts must be made to trace out its cause and remedy it. If due to syphilis, iodide of potassium and mercury will be of immense service. Galvanism is often tried with benefit.

Paralysis of  
the fifth  
nerve.

#### PARALYSIS OF THE FIFTH NERVE.

This disease mostly arises from syphilis, but may be due to other causes as already given in the chapter on paralysis of the third, fourth, and sixth nerves.

Symptoms.

*Symptoms.*—These refer to the portion or to the whole of the nerve implicated. In cases where the whole nerve is involved there is complete motor paralysis of the muscles of mastication, and complete sensory paralysis of the parts supplied by it. Thus, in sensory paralysis there is anæsthesia of one half of the head and face as far back as the ear. The mucous membrane of the lids, nose, lips, and also the gums and palate, and a portion of the tongue, and opening of the Eustachian tube are also involved. The eyes are insensible to external impressions, and therefore become inflamed ; the cornea

becomes opaque, ulcerates, and even sloughs; the sense of smell is perverted; and the taste is lost in the anterior two thirds of the tongue; the act of mastication is also imperfect owing to the loss of sensibility of the mucous membrane of the mouth, and the food collects unknown to the patient between the cheeks and gums. The motor paralysis includes paralysis of the temporal, the pterygoids, and the masseter collectively; during health they close the jaws, and perform various actions of mastication. In these paralysed muscles the electric contractility is lost, and the tissues soon waste.

When a portion of the nerve is involved or the paralysis is limited either to its ophthalmic, superior, or inferior maxillary division, the symptoms will be limited to the distribution of that diseased branch. Thus in affection of the ophthalmic, there is loss of sensation in front of the forehead, upper eyelid, the conjunctivæ, and front of the nose; of the superior maxillary, anæsthesia will affect the cheek, the upper lip, the side and interior of the nose, and mucous membranes of the cheek, gums, and palate; of the inferior maxillary, the lateral part of the head and face, the ear, lower lip, gums, tongue, and muscles of mastication will be affected.

*Treatment.*—In syphilis iodide of potassium and mercury are useful. If due to reflex causes, as hysteria, or to inflammation, the cause may be treated and removed. In cases of organic disease medical treatment is useless. In some cases electricity is useful in restoring both motion and sensation. Treatment.

## FACIAL PALSY. BELL'S PARALYSIS, PARALYSIS OF THE Facial palsy. PORTIO DURA.

This disease is usually due to the affection of some part of the course of the nerve. Thus, within the skull it may be due to pressure upon the nerves by foreign bodies; or Definition:

to disease of the nerve; or to syphilis; through the duct, it may be caused by inflammation of the nerve itself in its passage, or by caries or necrosis or other disease of the bones of the internal and middle ear. When external to the temporal bone it may be from injury or disease of the glands, and other structures in its neighbourhood. Exposure to a draught of cold air as in a carriage in full motion leads to inflammation of the nerve, and thus to palsy. It may occur at any age.

Symptoms.

*Symptoms.*—Paralysis sets in very rapidly, and is not attended with any pain or constitutional derangement. Sometimes after exposure to a draught of cold air there may be earache preceding the paralysis. There is complete absence of motion and expression on the affected side. The face is flattened and smooth, any wrinkles have disappeared, the features are meaningless, the paralysed half of the mouth shuts less perfectly than the other; when opened it also opens less completely, the angle of the mouth falls, and the mouth on the affected side appears broader than the sound portion; the mouth is drawn to the sound side. The alæ nasi fall in, and the nasal aperture is diminished; the eyelids on the paralysed side do not close, and the conjunctivæ become watery and inflamed; the lower ones droop and tears trickle down the cheeks. The patient cannot smile, blow or whistle, or wrinkle the forehead; when frowning the healthy half is thrown into vertical folds; normally the healthy half becomes transversely furrowed. He cannot elevate the lips nor expose the teeth on the affected side; the tongue is not affected in its movements, and articulation is impaired. The patient has difficulty in retaining fluids; when eating, the food collects between the cheeks and the teeth; the patient cannot spit out. In this paralysis there is only loss of motion; the sensation is perfect. Besides these symptoms of Bell's paralysis there are others superadded as the disease advances nearer to

the origin of the nerve. Thus, when due to cerebral mischief, the orbicularis palpebrarum is not paralysed, but when due to lesion in the course of the nerve the orbicularis is paralysed, and the patient cannot close his eye voluntarily, but can close it involuntarily. When the morbid process originates above the origin of the corda tympani nerve there will be dryness of the tongue, owing to the interference with salivary secretion, and diminution of sense of taste in the corresponding side of the tongue; or painful hearing, owing to paralysis of the tensor tympani or to hyperæsthesia of auditory nerve. If the lesion be behind the petrosal ganglia, the uvula will be drawn to the sound side, and the palate will become straight instead of arched; and there will be paralysis of the soft palate. Lesion in pons causes cross paralysis. If in corpus striatum the paralysis will be less complete, and muscles of the mouth will be also affected. In lesion of the nerve between its origin and its entrance into the bony canal, there is complete paralysis, also hemiplegia and derangement of intellect. If the disease be near or within the bony canal the auditory nerve is involved, and deafness and otorrhœa are present, with paralysis of the face. If the nerve outside the skull be affected, the eyes are wide open and the face is paralysed. Thus, in facial paralysis, due to causes within the brain, the lower part of the face becomes chiefly affected. In all the other forms the whole side is paralysed. If the nerve implicated be in its course through the temporal bone, perversion of taste, deficient secretion of saliva, slight drawing of the tongue towards the affected side, and a somewhat nasal sound are observable. If due to cerebral disease the electric irritability is retained. In all other forms it is impaired or lost.

*Diagnosis.*—The paralysis due to direct implication of the portio dura varies from paralysis of the portio dura due to cerebral lesion. In hemiplegia the eyelids and upper

Diagnosis.



half of the face are seldom affected; while in the primary affection of the portio dura the paralysis is general. In hemiplegia the motor paralysis of the fifth and the hypoglossal are involved with the portio dura, whereas in primary paralysis the muscles of mastication and of the tongue act perfectly. Again, in hemiplegia the paralysis of the facial nerve is not complete, and the muscles retain their electrical contractility, and they do not waste. In primary facial paralysis the paralysis is absolute, muscles do not respond to electric contractility, and waste even within a week.

*Prognosis.*

*Prognosis.*—When due to cold or debility, or to syphilis, recovery takes place in from six to ten weeks; if due to cerebral or intra-cranial mischief, prospects of cure are remote. The paralysis becomes permanent and recovery delayed if the response to electric contractility is feeble or absent.

*Treatment.*

*Treatment.*—As the disease is apt to produce permanent deformity, try to find out its cause, and if due to cold, a few leeches behind the ear followed by poultices may be at once adopted. If the case is advanced counter-irritations will do good. Electricity should be tried, and if contractility has disappeared faradization may take effect if applied late in the disease. It is recommended to use currents with rapid intermissions, and the muscles should be directly and in turn excited. The patient should submit to it for a long time, and very frequently. Persistent use of electricity, one pole placed over the exit of the nerve and the other over various muscles supplied by it is required. Healthy nutrition maintained by tonics, hygiene, and strychnine. If syphilis be present treat it.

Chronic lead poisoning.  
Definition.

### CHRONIC LEAD POISONING (DROPPED HAND).

Chronic lead poisoning is a common complaint with painters, plumbers, and workers in white lead facto-

ries. The carbonate of lead is the salt usually absorbed. The poison may act through the air we breathe, the water we drink, or through medicines used as lotions or ointments. It is taken in minute quantities into the blood, and becomes deposited in the muscles, nerves, and nerve centres; and they in their turn undergo fatty degeneration and atrophy, and their nutrition is also impaired.

*Post-mortem appearances.*—The lead has been found in the substance of the brain, and in the muscles, and also in various organs of the chest and abdomen. The bowels are contracted and empty, and the mucous membrane congested. The paralysed muscles shrink rapidly, and are pale and yellowish. They are degenerated in far advanced cases.

Post-mortem  
appearances.

*Symptoms.*—Persons under the influence of lead poisoning suffer in their general health. They present a blue line on the gums at their junction with the teeth, due to sulphide of lead from sulphuretted hydrogen emitted by the decomposing tartar; a dirty brown or black incrustation on the teeth, with tendency to decay; the skin is harsh and dry; countenance pale and earthy looking, and even sallow; conjunctivæ also pale and yellowish; breath offensive; there is great thirst, appetite lost, and sweet taste in the mouth; pulse infrequent and slow; and greater or less emaciation. They also suffer from colic and various affections of the nervous system. The colic has been treated of in diseases of intestinal disorders. Dropped hands, as a result of paralysis of the extensors, are most frequent. Hyperæsthesia of different parts, as numbness, neuralgic pains, aching of limbs and headache; motor disturbances, leading to paralysis, or tremors, or convulsions are frequent. Wristdrop is very commonly owing to the paralysis of the extensors of the forearm; the paralysed arm is often wasted and atrophied. In some cases the wrist is strongly closed from rigidity of the flexor muscles.

Symptoms.

The disease may come on gradually or suddenly. One

hand, the right, or both hands may frequently become implicated. The patient is unable to extend his hand upon the arm, and to abduct the thumb. When the arm is held out prone, the hand drops. The paralysed muscles waste rapidly, and although reflex sensibility is retained, the electro contractility is lost. There is no impairment of cutaneous sensibility. The paralysis often extends to the remaining muscles of the forearm, and very soon a hollow is perceived between the bones at the back of the forearm. The paralysis is generally limited to muscles supplied by the radial nerve with the exception of the supinators and muscles of front of the forearm and those of the hand.

*Duration.* The duration of lead palsy may vary from weeks to months or years, but where of short duration a cure is often effected. The disease is apt to recur.

*Prognosis.* *Prognosis.*—Is bad, where the paralysis is of long standing, and the muscles are extremely wasted, and there is total loss of electric contractility.

*Treatment.* *Treatment.*—Attempts must be directed towards the removal of the cause. Every care should be taken against its absorption either through the breath or water. For this purpose a little sulphuric acid may be added to the water used for drinking purposes. The secretions should always be kept free, and iodide of potassium used as an antidote; sulphur baths may also be tried. The Vagrábái baths, near Callian, in the Bombay Presidency, are highly recommended. Cleanliness is the best protective for workers in lead. For the restoration of the paralysed and wasting muscles galvanism is the only remedy that does good. Galvanic, slow and interrupted current, should be tried at first, and after a time Faradaic may be used. The current should be used twice a week for two or three months. The sitting should be for about ten or fifteen minutes, and each muscle separately

galvanised. Faradization produces no response at first. The galvanic obtains an unusual sensitiveness. The galvanism should be weak. When the galvanic fails to produce any effect the faradization succeeds.

### PARALYSIS IN CONNECTION WITH THE SPINAL NERVES.

Paralysis  
in connection  
with spinal  
nerves.  
Definition.

The paralysis is generally due to exposure to draughts of cold air, which gives rise to inflammation of the trunk of the nerve implicated. It is often mistaken for rheumatism.

*Symptoms.*—There is pain and tenderness in the course of the trunk and in the branches of the diseased nerve; there is also fever. Paralysis of the muscles supplied by them is followed by loss of electric contractility and rapid wasting. The sensory paralysis often precedes motor affections. The temperature also rises in the early stage, but falls in advanced cases.

Symptoms.

This paralysis includes lesion of the spinal accessory, of the radial or musculo-spinal nerves, and of circumflex nerve.

Paralysis of the radial may be due to pressure on the nerve during sleep, as in a chair, or to exposure of the arms to cold. The disease sets in with numbness or tingling at the tip of the fingers, and the wrists drop, and the patient is incapable of extending the fingers.

Paralysis of the circumflex is known as deltoid rheumatism. In it the patient complains of severe paroxysmal pain in the shoulder increased by movement. The symptoms last for a few days or weeks. The electrical contractility is retained, although the muscle may atrophy.

*Diagnosis from lead palsy.*—In this paralysis the electric contractility is unimpaired. In lead it rapidly diminishes or disappears. In this affection the supinator longus suffers, which is never the case in lead poisoning.

Diagnosis.

*Treatment.*—If with deltoid pain there is no fever or sign of acute rheumatism, and the pain is only confined to

Treatment.



the shoulder, Faradization with a feeble slow current may be tried with benefit. Frictions, local stimulants, and even blisters may be of service. In wasting or paralysis continuous current is indicated.

### INFANTILE SPINAL PARALYSIS (ESSENTIAL PARALYSIS.)

Infantile  
spinal  
paralysis.

*Infantile Spinal Paralysis* is an affection in young children, due to sclerosis of the spinal cord and motor nerves. The sclerosis is limited to the anterior cornua of the grey matter of the cord, and to the nerve cells within the cord. The disease is generally acute, attended with fever, and ends in permanent paralysis and atrophy of the affected muscles. It is characterised by total or partial loss of power over one or several groups of muscles, without any impairment of sensation.

Causes.

*Causes.*—The disease occurs between two months and ten years, and is often attributed to teething, to injury to the back, to exposure to cold, or to derangement of the stomach and bowels. It sometimes follows eruptive fevers and measles. Bad health and dissipation in parents cause it.

Post-mortem  
appearances.

*Post-mortem appearances.*—The only lesion observed is in the spinal cord. There is at first pigmental degeneration of the anterior cornua, and atrophy of nerve cells, and subsequently total disappearance of cells at some parts; there is also sclerosis of the connective cell tissues. The inflammation involves the nerve cells, and affects neuroglia. In advanced cases the cornua appear quite atrophied. At a later period the motor nerves become involved in the morbid process, they become atrophied, and their nerve tubules considerably diminished in calibre. The paralysed muscles are diminished in size, and their fibres become granular. They undergo atrophic changes till they ultimately present fatty degenerations. In a few cases the muscles present an increase in their bulk owing to hyperplasia of cells of the sarcolemma and to accumulation of fat.

*Symptoms.*—The child goes to bed quite well, but passes a very restless night, and suddenly the next morning paralysis of one arm, or of an arm and a leg, or of both legs may be noticed. In some cases the disease sets in with fever, lasting for a very short time, or for a few days, and is sometimes attended with convulsions, coma, or other cerebral disorders. The paralysis comes on suddenly and may follow fever or convulsions. The force of paralysis is very rapid and spreads in two or three days. In this paralysis the muscles are flaccid at first, and there is want of reflex excitability. The muscles rapidly fail to respond to electrical contractility. In rare cases palsy subsides in from four to eight weeks, generally however it proves incurable. In this disease the paralysed muscles undergo rapid degeneration and wasting. The pulse is small and feeble, the temperature falls considerably. With care it often tends to recovery.

Symptoms.

*Characteristic symptoms* are complete paralysis of certain muscles. The muscles are flaccid, and there is loss of reflex and electrical contractility. There is no pain, and there is perfect control over bladder and rectum, and absence of bedsores and of cutaneous eruptions.

Characteristic symptoms.

The disease lasts from two to six months, when some improvement takes place, and few muscles regain their normal reflex and electrical power, and could be moved. In others they become permanently paralysed and also rapidly atrophied. Some paralysed muscles retain their natural bulk owing to the growth of interstitial tissue and fat, and although of natural size they do not at all respond to electricity. Besides muscles the bones also become ill-developed and are thinner and shorter than they should be. Again, the paralysed limb shows a great diminution of temperature, which is more marked in this than in local paralysis. Besides these changes various deformities of the hand and foot are apt to supervene, owing to the unequal action of

Duration.

the paralysed and healthy muscles, and also of the opposing muscles. Talipes equinus is the most common deformity in such cases.

Prognosis.

*Prognosis.*—The part affected improves, but never gets quite well.

Treatment.

*Treatment—Local and General.*—If the case be seen from the first, the fever may be treated by appropriate means ; if the patient be strong leeches to the spine, or counter irritation, or cupping may be tried ; and if the gums are swollen they should be incised. The child should be kept at rest. It is of the greatest importance that the paralysed parts should be systematically and persistently used. The induced current should be applied directly to the paralysed muscles and limbs, and followed by friction several times a day.

Little good can be expected in cases where the muscles entirely fail to respond to electricity. Generally in paralysis muscles at first respond to galvanic and refuse Faradaic electricity, to the latter they ultimately respond when the galvanic is refused, but faradization of the affected muscles tried for months and even years has produced good results. If the muscles under electricity do not improve its persistent use has the advantage of preventing deformities. Besides electricity, exercise in the open air, good milk, and nourishing diet, or even residence at the seaside, may be recommended ; frictions, shampooing, and baths may be tried.

This form of spinal paralysis occurs in adults, though rarely, and the symptoms are as in children, more or less fever lasting a few days, followed by motor paralysis of voluntary muscles without tendency to bedsores. The muscles are flaccid, rapidly lose electric contractility, and waste. The deformities which are found in infantile paralysis are absent in adults since growth has ceased ; the bones do not become shortened.

## GENERAL SPINAL PARALYSIS.

General  
spinal  
paralysis.

The disease is limited to the anterior cornua of the grey matter of the cord, and is characterised by general paralysis, wasting and flaccidity of paralysed muscles, want of response to reflex irritability, or to electrical contractility; the bladder and rectum are under control, and the disease ends in recovery.

*Causes.*—The disease generally occurs between thirty and forty, and is generally attributed to undue exposure to cold and damp. Causes.

The lesion is inflammatory, and affects the anterior cornua of the cord. In these respects it resembles infantile spinal paralysis.

*Symptoms.*—The disease sets in without any warning; the patient while walking perceives weakness in one or both feet, and the flexors become paralysed before the extensors. The patient in a short time is unable to walk, but when in bed he only feels that the muscles are flaccid; there are no tremors, no convulsive spasms, no loss of co-ordination. The muscles do not respond to electric contractility, and very soon become atrophied; often the whole limb undergoes atrophic change in a very short time, the temperature of the limb is low, and the skin livid. The paralysis gradually extends to the hands, and in a few weeks the whole upper extremity becomes paralysed. The disease gradually spreads to the trunk, and to head and neck, and even if unchecked the muscles of deglutition, respiration, and speech are affected. Symptoms.

*Terminations.*—Where death takes place it is from syncope or from implication of the medulla oblongata, giving rise to paralysis of deglutition and respiration. Sometimes patients recover completely. The duration may vary from months to years. Terminations.

*Characteristic symptoms.*—The origin is insidious, Characteristic  
symptoms.



all voluntary muscles are attacked, and rapid waste and loss of electrical contractility set in. The wasting occurs in a mass, in a whole limb and not in a muscle singly. There are no tremblings, and no convulsions. There is retention of control over the bladder and rectum, and the mental faculties remain unimpaired.

## Treatment.

*Treatment.*—The same as recommended in previous chapter on Infantile Paralysis. Galvanism must be persistently given.

## Progressive muscular atrophy.

## PROGRESSIVE MUSCULAR ATROPHY (WASTING PALSY).

## Definition.

Progressive muscular atrophy is characterised by atrophy of muscles, first of one hand, next involving the other, then spreading to limbs and trunk. The atrophy progressively increases in degeneration.

## Causes.

*Causes.*—This disease occurs most commonly in males from twenty-five to thirty-five years, does also occur in children, appearing in some cases to be hereditary, and has been attributed to wet or cold, or to violent emotions, or to excessive bodily or mental work.

## Pathology.

*Pathology.*—The disease is connected with changes in the motor columns of the cord in most cases, although it may have its origin in the periphery. The parts affected are the grey matter of the anterior cornua of the cord, and also the roots of the motor nerves which emerge from it. The function and nutrition of these nerves are destroyed, and consequently the muscles to which these nerves are distributed become atrophied. The affected muscular fibres are in a state of granular, fatty, and fibroid degeneration, or of sclerosis, and are soft, pale, and yellowish, and often associated with an excess of fibrous tissue. The cells of the anterior cornua of the grey matter of the cord are found in a state of sclerotic degeneration and softening. The cells involved are not motor cells, but those which

supply nutrition to muscles, and hence there is no motor paralysis. These cells often disappear altogether.

*Symptoms.*—The disease sets in insidiously and is known Symptoms. by the wasting and loss of power of the voluntary muscles, by impaired general sensibility, and diminution of the mental faculties. The muscular atrophy begins either in the ball of the thumb, in the shoulder, or hand, and gradually advances to every voluntary muscle of the body, except the muscles of mastication, and of the eyeballs. The wasting of the thumb and other muscles of the hand gives it a claw-like form. Gradually wasting extends, and there is loss of power, with inability to swallow or to breathe. The wasting of the muscles gives rise to various distortions, which are well seen in drooping shoulders and in the hands, which hang at the side as if they did not belong to them; the tissues have a soft flabby feel. When progressive atrophy attacks young children it begins with effacement of the facial muscles, causing the countenance to look vacant. In these cases the irritability and the contraction under electricity are diminished considerably; the mind is clear; the judgment remains sound; general health continues good unless there is paralysis involving the muscles of mastication and deglutition. There is no loss of power over the bladder or rectum. The muscles of the limbs are primarily affected, then those of the trunk, but the muscles of the special senses are rarely diseased. In this disease the arms are primarily affected, where as in ataxy, the lower limbs. Sometimes there is remarkable quivering of the affected muscles, which is best known by gently tapping the surface. Galvanism affects the muscles in an irregular way. Sometimes they respond to Faradization, only sometimes to both the continuous and the induced currents.

*Diagnosis.*—Progressive muscular atrophy often simulates Diagnosis. acute infantile paralysis. In infantile paralysis the disease sets in suddenly and with fever. In progressive atrophy the

onset is insidious and there is no constitutional disturbance. In progressive atrophy there is atrophy followed by flaccidity, and when the muscles are completely atrophied the paralysis also becomes complete. In progressive atrophy the muscular atrophy bears relation with electro-contractility, and the loss of contractility is complete only when the atrophy has reached its extreme degree. In progressive atrophy the affected muscles are subject to muscular or fibrillar oscillations when excited by a tap or by a prick. The vibrations can be seen and felt as if various threads were vibrating more or less rapidly.

In this disease, as in infantile paralysis, there is lowering of the temperature of the diseased limb, absence of any pain, tendency to form bedsores or cutaneous eruptions, and the bladder and rectum are under the control of the will, and the cutaneous sensibility is retained.

*Prognosis.*

*Prognosis.*—Death generally occurs from asphyxia, owing to the muscles of deglutition, and diaphragm and intercostal muscles, becoming paralysed. The duration of the disease may be many years, and in some cases it is confined to the muscles of the face and hands. As long as the disease is confined to the extremities there is hope of recovery.

*Treatment.*

*Treatment.*—As the disease often arises from excessive use of the muscles and fatigue of mind, rest is essential. It is also important to improve the general health by nutritious diet, tonics, gentle exercise, passive motion, and electricity. The continuous and interrupted currents should be applied in turn to each affected muscle, those most important to life being first attended to. When atrophy is great, stimulation for a longer time and a more intense current should be used with shorter intermissions. The sitting should not be beyond fifteen minutes, and one minute should be allowed to each muscle. Pain may be relieved by fomentations; some recommend nitrate

of silver in these cases, and they believe that the sense of touch under its influence becomes more acute, the neuralgic pains cease, and the appetite improves. Iodide of potassium is of course indicated if there be suspicion of syphilis.

### LATERAL SCLEROSIS

Lateral  
sclerosis.

Is a marked inflammatory condition affecting the lateral white columns of the cord, symmetrically and in their whole length and even extends to the anterior cornua, and occasionally to the sensory elements. It is characterised by paralysis of the limbs, with rigidity and contractions, and associated with simultaneous wasting of the muscles and sometimes with pain.

*Causes.*—The disease is often secondary to hæmorrhage into the substance of the cerebrum or to softening of a limited portion of the brain substance or to lesion in the crura, pons, medulla, or cord. It may be idiopathic and due to exposure to wet and cold. It occurs in women more than in men, and between 25 and 50 years. It may be also due to local injury.

Causes.

*Morbid anatomy.*—After hæmorrhage or softening in the brain has existed for some time it leads to sclerosis of the corresponding crus cerebri and thence to the pons, whence it extends into the anterior pyramid and along the decussation to the opposite side of the cord, and there occupying the lateral white columns. Over the surface of the cord at the affected part the lamina of the white substance is healthy. In the cervical portion of the cord the sclerosis extends from the anterior cornua in front to the posterior root behind. The disease extends downwards, and in the dorsal region it limits itself to the neighbourhood of posterior cornua and to the nerve fibres springing from them.

Morbid  
anatomy.



Where sclerosis is idiopathic the disease generally implicates the right and left tracts simultaneously. It has also a tendency to extend beyond the lateral white columns. It seldom involves the sensory tract of the grey matter of the cord, the posterior columns or the posterior roots. It is always the anterior cornua and their large cells that are the seat of sclerosis. In idiopathic, as in secondary sclerosis, the lateral extension is greatest in the cervical portion, and then diminishes as it extends downwards.

Symptoms,  
Idiopathic  
cases.

*Symptoms.*—In idiopathic sclerosis there is gradual increasing paralysis of the affected muscles, attended with tremors during voluntary movements, and gradually increasing rigidity on irritating them. The rigidity is moderate at first, and hence the limbs are extended, but in advanced cases the rigidity is great, and the limbs are flexed. There are also spasmodic convulsive tremblings of the paralysed muscles. The muscles do not waste, and they exhibit electro contractility and reflex irritability; there is no anæsthesia, and no pain. In secondary cases, as in paraplegia from disease of the limited portion of the cord or from blood pressure, the sclerosis extends to the lateral columns, and thus the muscles of the lower extremities are rigid and contracted. Often such rigidity may also be due to old cerebral mischief without sclerosis. But in idiopathic cases, where the disease extends into other regions of the cord, we find, in addition to the symptoms already mentioned, more or less pain, tingling, numbness from implications of posterior roots, and more or less rapid wasting from its extension into the anterior cornua. The idiopathic sclerosis comes on insidiously without fever. There may be some numbness or tingling of the parts, but they soon become paralysed. One arm is first affected, and the other soon follows. The arms become weak and then become emaciated. The paralysis and wasting affect all muscles simultaneously.

Secondary  
cases.

The wasting muscles are liable to fibrillar variations. They often retain electric contractility, and voluntary movements are attended with trembling. The limbs soon become rigid, and contracted, and deformed, the arm is close to the side of the body, and cannot be abducted; the forearm is also semiflexed, and cannot be extended without pain. The wasting is far more rapid than in progressive muscular atrophy because in this all the muscles are involved at one and the same time, hence emaciation is faster in lateral sclerosis than in progressive muscular atrophy. After a period varying from six months to two years the lower limbs become involved, but there is scarcely any atrophy as the motor nuclei of dorsal and lumbar regions are not affected, and thus in the lower limbs there is merely tingling or numbness and loss of power. Gradually paralysis sets in, and when once established the paralysis progresses rapidly, and soon involves all the voluntary muscles. In many cases the contractions rapidly follow and thus cause powerful adduction of the thighs, and the feet become deformed. Besides contractions there are tremors which impede walking. At a very late period the legs atrophy, and the rigidity then ceases. There is no bed sore, and control over the bladder and rectum is retained. If the patient lives the sclerosis often extends to the motor nuclei of the medulla oblongata, and they become implicated and there is thus paralysis of the legs, face, tongue, soft palate, and also glosso-labio-laryngeal paralysis. The disease does not always commence with the upper extremities; it may with the lower and then extend to the upper limbs.

*Diagnosis.*—In progressive muscular atrophy the paralysis and wasting creep in from muscle to muscle; in lateral sclerosis the paralysis makes rapid progress, and all the affected muscles are involved at one and the same time. Diagnosis.

*Prognosis.*      *Prognosis* is very unfavorable. The disease is very rapid in its progress, and becomes fatal in two or three years.

*Treatment.*      *Treatment.*—Avert the dangers to which the patient may be exposed, attend to the state of general health, and where the disease is established galvanism, frictions, shampooing, &c., as in the last variety, may be tried.

*Locomotor ataxy.*

### LOCOMOTOR ATAXY.

*Definition.*      It is also called *tabes dorsalis*. Ataxy signifies want of order or of co-ordination. Co-ordination is composed of two kinds of muscular action: 1. The harmony between the antagonists, or the muscles would contract when excited; and, 2. Instinctive, but devoid of any method or methodic association of muscles, which regulates or guides them in an orderly manner. Thus in health voluntary muscles retain contractility under the control of the will. If one contracts too soon or another relaxes too quickly the co-ordination is disturbed. In this disease the co-ordinating movements may become diminished or lost, although considerable voluntary power may still remain. Thus, we find apparent motor paralysis of the lower extremities and the patient experiences difficulty in walking when his eyes are shut, or if the room is dark, and the gait is uncertain and tottering; unlike the blind man he holds himself backwards and falls forwards, and unlike a drunkard he does not reel from side to side. The disease is gradually increasing in degree and extent, and sooner or later involves the upper extremities and other parts. The affection is generally of a chronic kind, and goes on from day to day without any improvement. The word ataxy literally means deprivation of place or order. There is no actual paralysis, but the sensibility is more or less impaired. The patient also complains of neuralgic pains in the legs and feet.

*Causes.*      *Causes* are obscure. The disease is chiefly attributed to

exposure to cold or wet, or to fatigue or injury. It is often associated with epilepsy and insanity, and occurs between thirty-five and fifty years of age. It rarely affects women. Sexual excess is commonly enumerated among its causes.

*Pathology.*—In this disease there is chronic myelitis, grey degeneration of the posterior columns of the spinal cord, and the posterior spinal nerves are also implicated, and hence besides co-ordination the sensation is also affected. Pathology.

*Post-mortem appearances.*—The disease is a sclerosis of some portion of the posterior columns of the cord, gradually increasing till it invades their whole extent. Both columns are symmetrically affected, and the lower part more than the upper. Some eminent physiologists of the present day assert that in many cases of ataxy the posterior pyramids are found to be tolerably healthy, and that sclerosis is only found in white matter between the inner and posterior aspect of posterior cornua and nerve roots on the one hand, and the posterior pyramids on the other. The sclerotic cord is indurated, grey and translucent, and swollen or shrunk in size. It is composed of new connective tissue, a result of destruction of the normal tissue, which is degenerated, and contains amylaceous bodies. The disease often invades the posterior pyramids, posterior roots of nerves, and often portions of the posterior cornua. The cord appears flattened from before backwards, and enlarged. The flattening is only apparent, as there is diminished bulk of the affected columns, which are sometimes even reduced to a cypher. The membranes may be thick and adherent. Further morbid appearances relating to this sclerosis have already been fully described while treating of sclerosis generally. Post-mortem appearances

*Symptoms.*—The disease is occasionally sudden in its onset, and there is from the first want of co-ordinating power and apparent paralysis. In a majority of cases it is insidious, and may continue to increase for months or Symptoms.



even years. The patient feels paroxysmal momentary, sharp, shooting pains in the course of nerves of the lower extremities, has inability to run, feels his legs too heavy, and often fatigued after the slightest exertion. Very often erythematous or vesicular eruptions appear in the course of the affected nerves. The sensibility of the parts affected by these diseased nerves is also increased. The patient is generally restless at nights. In many cases the nerve pain may implicate viscera, and there is often painful and frequent micturition, also pain in the urethra, and painful defæcation; the heart may become deranged, the stomach is disordered, and there may be vomiting and gastric pain. Sometimes the stomach pain may be so severe that the patient faints. There are also painful sensations about the limbs and joints, temporary disorder of vision, or impotence; generally a desire for sexual intercourse is increased to a great many times within a short period.

Characteristic  
symptoms.

*Characteristic symptoms.*—Before the disease is established, there are pains in the course of certain nerves of the trunk and the lower extremities; erythema or vesicles in the course of affected nerves; the pain is deep seated as if in bones with aching in the back and in joints. Also pain as if there were some constriction round the waist. The constrictive pain is generally permanent, the others are temporary and often recur. Also pain in the bladder, rectum, stomach and bowels.

Anæsthesia.

*Sensory paralysis (anæsthesia).*—This affects the lower extremities and it may be temporarily retarded, or permanently lost. Prick his legs, and no response is made for some time. The disease extends upwards to the cranial nerves, and there is loss of sensibility in the course of the fifth nerve, and sensory paralysis of the third nerve. There may be external or internal squint or ptosis, or the pupils are extremely contracted or sometimes unequal. The patient

may see properly and distinguish small objects or colour of objects ; he may recognise yellow and blue, but fails to distinguish red and green ; very often he sees with only one eye. As the case advances there is complete blindness. All these changes are said to be due to the atrophy of the optic disc, and not as a result of retinitis due to cerebral tumours. Under the ophthalmoscope the disc looks chalky and opaque, the margin has lost its redness, and the retinal vessels are empty and thin in calibre, and even appear to terminate abruptly. This atrophic condition is the result of sclerotic changes in the optic tract due to the extension of sclerosis which takes place in the posterior columns of the cord. Very often the disease extends as far as the corpora geniculata.

Disturbed  
vision.

Besides the disturbed vision, there are observed frontal and occipital headaches and pain in the course of the fifth nerve and its ramifications. Deafness may be common. Very often joints, especially the hip and knees, become swollen with little or no pain, sometimes they follow recovery, at others they undergo disorganization. The pulse is said to be frequent and dicrotous in these cases. In many cases these premonitory symptoms aggravate, and ataxic phenomena are superadded. Occasionally, where the disease sets in suddenly the ataxia is the first symptom, and others already mentioned appear subsequently. These phenomena are—

1. Certain difficulty in walking, tumultuous gait, with numbness and tingling in the toes and fingers ; there is no actual loss of motion, but the patient cannot take long walks without fatigue and experiences loss of co-ordinating power in the muscles of the legs, and hence cannot walk steadily without support. While rising from his seat, or while turning suddenly on his heels and when walking in the dark, he slips about and has an uncertain gait. His movements become tumultuous, he cannot stand erect on his feet when blind-

Constrictive  
feeling.

folded. He has difficulty in starting, and when requested he pauses for a while to balance himself, and then starts at once with body bent forwards and legs apart. He is also powerless to arrest his own progress, or to turn round. Gradually every movement becomes tumultuous, and while walking he has to pay special attention to the movements of the lower extremities. 2. A feeling of constriction round his waist is complained of as if a cord was tied tightly round it. 3. There is also diminution of sensibility, constipation, and difficulty in retaining the urine. These symptoms are sometimes temporary, at others they may be permanent. When temporary they often recur at intervals. After a time the symptoms become fully established; he is very unsteady in his movements, he cannot walk, but only staggers, and advances precipitately, and in trying to walk he lifts the foot up to an unnecessary height in the air, then throws it forwards and outwards, and brings down the heel with a heavy stamp. The arms are equally affected, there is unsteadiness in picking up anything, and he requires the use of both hands to catch hold of an object, or the movements are very clumsy. If asked to touch his nose with his thumb, and then to extend his fingers, he cannot do so, but he often strikes his eyes. Very often the patient, though bedridden, can freely move his legs while in bed or sitting, which is not the case in paraplegia. In this disease the muscles do not waste. At last the loss of motion becomes more general, it creeps upwards and affects muscles of other parts of the body, and the nerves supplying them, chiefly the third pair of cranial nerves. Ultimately emaciation follows, and death takes place from exhaustion, consumption, or from some complications, as erysipelas, bronchitis, or pneumonia. During all this time the muscles do not waste, although the sensibility is much impaired, and the patient feels as if his feet are swollen or soft, and as if he were treading on wool or

sand. The reflex excitability and electro-muscular contractility are both retained, and the cognisance of differences of heat or cold is continuous to the last. The want of co-ordinative power begins in the lower extremities, then extends to the hands and arms.

*Termination.*—The progress of the disease may be retarded for many years, or death from complication may occur within six months. Death may be due to complications; to paralysis of muscles of deglutition or of respiration; to disease of the kidneys; or to bedsores. The form of paralysis clearly indicates its special origin. Complete hemiplegia is rare. Usually the disease takes the form of incomplete hemiplegia. The bladder and rectum are under control, and bedsores, if they occur, come on at a very advanced period. Termination.

*Diagnosis.*—Locomotor ataxy may be confounded with *chronic myelitis*; *diseases of the cerebellum*; *softening of the brain*; *general paralysis*; and *chronic alcoholic poisoning*. Diagnosis.

In chronic myelitis there is paralysis and the symptoms are referable to inflammation. There is fixed pain at a certain point in the back, increased by pressure. There are muscular spasms, diminished electric contractility, and atrophy of muscles. In disease of the cerebellum there is fixed and permanent pain in the back of the head and vomiting. These symptoms are absent in ataxy. In ataxy there is double vision, or strabismus which may come on from the first and may often disappear. In disease of the cerebellum the eye affection comes on late and continues longer. In cerebellar disease there may be vertigo, and convulsions, but these are not present in ataxy. In both there is impulse to rush forwards or backwards, and the patient cannot maintain equilibrium. In softening of the brain there is early impaired memory and intellect, and often there is hemiplegia. In alcoholic poisoning the history and smell of alcohol are the best symptoms for Chronic myelitis.  
Cerebellar disease.  
Softening of brain.  
Alcoholic poisoning.



diagnosis. It is often confounded with other forms of paralysis of cerebral or spinal origin, and with progressive muscular atrophy.

Cerebral  
paralysis.

Cerebral paralysis due to hæmorrhage into the substance of brain is ushered in by delirium or convulsions, followed by hemiplegia and coma. In hemiplegia the leg improves first, then the arm. The muscles are rigid, but there is no tendency to atrophy or deformity. Infantile paralysis occasionally sets in with a single convulsion. There may be paraplegia, the loss of power is limited to one limb or to a single muscle or to a group of muscles, and if also hemiplegic the arm regains power and the leg remains paralysed. There is also diminution of muscular excitability and of electric contractility with wasting of muscles.

Infantile  
paralysis.

Acute  
myelitis.

In myelitis the loss of power over the lower extremities is complete. There is also loss of sensation and there is paralysis of the bladder and rectum. In this, as in infantile, there is diminution of reflex excitability and electro-muscular contractility, and there is wasting of paralysed limbs. In myelitis the tendency of paralysis is to increase. Ataxy may simulate progressive muscular atrophy. In both the progress is gradual, the temperature of the paralysed parts is not lessened, and power of motion and electro-muscular contractility is unabated. There is quivering of atrophied muscles, but in progressive muscular atrophy there is atrophy gradually attacking all muscles.

Progressive  
muscular  
atrophy.

Treatment.

*Treatment.*—Careful attention to the diet and hygienic laws. Oxide of silver, nitrate of silver with hypo-phosphate of soda may be tried. The best results can be obtained by absolute rest in bed, a fair quantity of animal food, stimulants, and broth. For the relief of neuralgic pains use anodynes. Constant current of Faradization with intermittent current to the back and limbs are useful; some recommend ergot, turpentine, arsenic, and bromide of

potassium. Where there is a history of syphilis, iodide of potassium has sometimes cured the ataxy.

### GLOSSO-LABIO-LARYNGEAL PARALYSIS. BULBAR PARALYSIS.

Glosso-labio-laryngeal paralysis.

In this paralysis the organs of speech and deglutition are affected. The medulla oblongata is the first affected, and the seventh and ninth nerves chiefly, and spinal accessory of the eighth pair are involved. It is characterised by paralysis of the tongue, lips, larynx, and soft palate. Definition.

*Causes.*—It is a disease of adult life, and attacks women more than men, and may be due to undue exposure to wet and cold, or to mental or other excesses. Very often effusion of blood into the pons or into the medulla oblongata, or syphilis is the cause. Causes.

*Post-mortem appearances.*—There is sclerosis; more or less atrophy (in the fourth ventricle) of the motor roots of the hypoglossal and the spinal accessory, and roots of the vagi and facial nerves, also of the fifth. All these changes are secondary to those occurring in the medulla oblongata. Very often this disease occurs in the course of lateral sclerosis, showing that it may be a disease secondary to the primary sclerotic change in the anterior pyramids. Post-mortem appearances.

*Symptoms.*—There is slight, slow, and gradual loss of power of the facial nerves and of the muscles of the tongue, soft palate, pharynx and larynx, and orbicularis. The lips are also paralysed. There is impairment of the articulation of words at first, then the speech becomes reduced to a mere whisper. From the flaccidity of the lips the saliva dribbles, and owing to the paralysis of the tongue mastication and deglutition become difficult; the food collects between the gums and the cheeks, and there is difficulty of swallowing, often the food becoming impacted in the larynx and death results from suffocation. Paralysis of the tongue Symptoms.  
Paralysis of lips.  
Of tongue.

gradually increases, there is difficulty in protruding it, and it lies motionless on the floor of the mouth; it is often pressed and indented by the teeth. The muscles of the soft palate and of the fauces next suffer, they hang down flabby, so that the posterior nares cannot be closed, and the voice soon becomes nasal; there is difficulty of swallowing, and food passes back through the nose. The lips are affected from the first, and the patient cannot whistle. The lips get large, and the mouth cannot be closed, and the saliva flows out from the mouth. As the case advances the pharynx and the larynx are implicated, and deglutition becomes difficult, and even impossible. The patient cannot even utter any articulate sound. The speech is not merely thick as in facial paralysis, not a meaningless nonsense as in aphasia, but is utterly lost or a slight nasal syllable may be left. Gradually the saliva from being long retained becomes sticky and thick, the food often causes choking, and may escape into the larynx or into the nose. At an advanced stage the pneumogastric nerve is involved, and the respiratory muscles and the heart become paralysed. There is great dyspnoea, the patient is liable to syncope, and the pulse is feeble and extremely irregular and quick. Notwithstanding this extensive nerve paralysis the trunk of the nerve is not wholly paralysed, and the patient can close the eye, showing that the orbicularis palpebrarum is not affected; and although the larynx is paralysed, the breathing continues, showing that there are separate nerves for vocalisation and for respiration, the spinal accessory being for vocalisation or voluntary opening and closure of the glottis and for tension of the vocal cord, and the pneumogastric for the respiratory movements of the glottis.

These paralyses are unattended with fever, pain, or dizziness, or any mental defect. The appetite is good, but the patient cannot swallow food. The disease often runs a rapid

course, and death occurs from starvation ; or from asphyxia from impaction of solid food into the larynx ; from an attack of dyspnœa or of syncope ; or from complications of the lungs ; or from paralysis of the respiratory muscles. Duration varies from six months to three years.

Very often the disease is a complication of disseminated sclerosis, occurs in the last stage of lateral sclerosis, and is associated with progressive muscular atrophy.

*Treatment.*—Galvanism as recommended in former dis- Treatment.  
eases well applies to this form of paralysis. Attempts must also be made to relieve symptoms, and if he cannot swallow feed him by enemata or by the stomach-pump. If due to syphilis give iodide of potassium. In some cases strychnia may be tried.

## DISSEMINATED SCLEROSIS.

Disseminated  
sclerosis.

(INSULAR SCLEROSIS OF THE CORD AND THE BRAIN.)

*Rhythmical paralysis.*—Some physiologists call it multiple sclerosis. This form has long been confounded with paralysis agitans, inasmuch as there are tremors in both. In this affection the movements are slow and rhythmical, and fully under the control of the will. The disease runs a rapid course, and ends in spasm and contraction of the limbs. The disease is characterised by numerous reddish-looking patches of sclerosis scattered over different parts of the brain or spinal cord, and is known by impairment of mental faculties ; by tremors of voluntary muscles of the head, neck, limbs, and trunk ; by difficulty of speech. Gradually the tremblings merge into paralysis with rigidity and contractions of the limbs.

Definition.  
Rhythmical  
paralysis.

*Causes.*—The disease from some unexplained cause is Causes.  
common in women. It may occur between the ages of twenty and thirty. Exposure to wet and cold and various moral influences and causes, already described previously



in detail in other kinds of sclerosis, give rise to it ; very often neuralgias and hysteria predispose to it.

Morbid  
anatomy.

*Morbid anatomy.*—The spinal cord is in a state of chronic inflammation. The neuroglia and the connective tissue of the anterior and of the motor columns are thickened and hard ; very often these hard masses may be traced upwards to the brain. The disease may affect the cerebrum, cerebellum, pons, medulla, and cord, and may be found in patches in these various centres at the same time. If confined to the cerebrum the parts chiefly affected are the corpus striatum, the optic thalamus, the corpus callosum, and the septum lucidum. Is seldom found in the grey matter of the convolutions. In the cerebellum its chief invasion is in the corpus dentatum. In the pons the peduncles and the corpora albicantia are affected. In the medulla it implicates various parts, including the floor of the fourth ventricle. The cerebral and spinal nerves sometimes escape. The first, second, and fifth pairs are those most often affected by sclerosis.

Microscope.

The sclerotic patches are rounded, and resemble grey matter ; they often project above the general level, but are sometimes depressed below it. Under the microscope each patch consists of three zones. In the outermost the neuroglia and the nuclei are increased in size and number, but the nerve-tubules are diminished in calibre on account of partial disappearance of white substance of Schwann. In the next zone the neuroglia are still more increased, the nerve-tubules are more widely separated, and much more diminished in size, and the white substance has completely disappeared. In the central zone the neuroglia is overgrown, and the nerve-tubules and even nerve-cells have disappeared.

Symptoms.

*Symptoms* depend upon the size and number of patches, and upon their seat. Thus, if a patch occupies the posterior columns of the cord we find locomotor ataxy, and if the

anterior cornua of the grey matter the progressive muscular atrophy. If the medulla be the seat of insular sclerosis there will be glosso-labio-laryngeal paralysis; if the cerebrum be affected hemiplegia will follow. Where the sclerosis is distributed to several centres at the same time the symptoms indicate the complex lesion.

Pathognomonic symptoms of disseminated sclerosis are—  
1, tremors; 2, affection of the eyes; 3, defective speech; 4, headache, with giddiness; 5, partial loss of motion in the limb or limbs; 6, contractions of limbs; and 7, disordered and depraved mental faculties. Each requires a detailed description.

*Tremors.*—They are absent during sleep, and when at rest they increase with muscular efforts; the patient's attention drawn to the task of lifting a weight increases the tremor. He has difficulty in walking or standing erect, and his limbs, trunk, and head are all agitated. Very often the tremulousness may be limited and only confined to one leg or to one arm, or even may be altogether absent for a time, even through the sclerosis may exist. Tremor is not the earliest symptom of the disease, but sets in in a variable time after the attack and ceases with the paralysis. These tremors often resemble tremors in paralysis agitans. In the latter the tremulous movements are more rapid and regular; they occur even when the patient is at rest, and rarely implicate the head and neck. Those of chorea are more violent, less regular, more under the control of the will, and are in the direction of the general movements of the limbs.

*Affection of the eyes.*—Double vision is common in the early stage, but blindness is rare. Nystagmus is a prominent symptom, and consists in oscillations of the eyeballs when the patient begins to stare at a fixed object; it may cease when the patient is asleep.

*Defective speech* is a constant symptom; there is a

pause after each syllable, and the syllables are uttered imperfectly and with difficulty, the lips and tongue tremble during speech.

**Vertigo.** *Vertigo*.—Is an early symptom and occurs in short paroxysms; it may sometimes be continuous.

**Partial loss of motion.**

*Partial loss of motion in one leg*.—The patient feels the leg weak, heavy, and drags it in walking. Soon the other leg follows, and the weakness then extends to the arms. There may be also tingling or numbness and impaired sensibility of the skin. There is no paralysis of the bladder or rectum, no wasting of the paralysed limbs, and reflex and electric contractility are unimpaired.

**Paralysed limb.**

*The contraction of paralysed limb* occurs and the leg is stiff on extension, till gradually rigidity becomes permanent. Sometimes the flexors prevail, and the limbs are flexed at all the joints.

**Condition of mind.**

*Condition of the mind*.—The face is vacant; the aspect sad; the mind and intellect impaired; the patient maniacal or demented, laughing or crying, or sitting stupid and dull.

**Summary of symptoms.**

**First period.**

The symptoms above detailed can be summarised into three periods:—The first period extends from the commencement to the rigidity of the muscles. In it the symptoms begin with vertigo or with double vision, which is soon followed by embarrassed speech. The progress is very slow and may last for many years, when the second period sets in with further aggravation of these symptoms, and the patient is now bedridden. In this period there is rigidity of the limbs, but the organic functions are not affected. The third period is that of deranged organic functions. The appetite fails, diarrhœa sets in, bedsores form, the sphincters cease to act, and the case ends in death.

**Second period.**

**Third period.**

**Duration.**

*Duration* from six to ten years. Death may be due to hæmorrhage, or to inflammation of the bladder, to bedsores, or to other nutritive debility.

*Treatment.*—The tremblings may be checked for a time by nitrate of silver and strychnine. Arsenic, bromide of potassium, ergot of rye, and even belladonna have been tried without permanent good. Treatment.

### PARALYSIS AGITANS.

*Paralysis agitans* is characterised by trembling of the limbs from some fault or want of nerve power, independently of the influence of the will. There is no absolute powerlessness, and the patient is unable to walk steadily and generally loses his balance. Paralysis agitans.

*Cause.*—It is a disorder of advanced life, appears after forty, and may be due to degeneration in the cells of the spinal cord. Chronic alcoholism, which impairs the functions of the cord, also leads to it. It runs a very protracted course. It is often due to violent emotions, grief, and rage. May depend on exposure to wet and cold. Injury to peripheral nerves by inducing neuralgic pains may often lead to trembling of the parts involved. Very often functional disorders, as hysteria or reflex irritations, give rise to it. Cause.

*Morbid appearances.*—Nothing definite as regards any lesion in the nervous centres has been yet discovered. At one time the disease was confounded with insular sclerosis, and as such the morbid lesions were described in connection with paralysis agitans. Morbid appearances.

*Symptoms.*—The disease may set in gradually or suddenly. When slow and insidious there is at first a sense of profound fatigue or neuralgic pain in one finger or in one limb. This is soon followed by continued shaking of the hand or foot, or of one thumb, or of the fingers. The trembling is transitory at first, and disappears for a long interval. The trembling is often under the control of the will, and ceases during sleep and under the action of narcotics and when the parts are in action, Symptoms.



as during writing or during lifting a weight. The patient has a hurried gait in walking, often runs or plunges forwards at any tangible object, and is unable to walk slowly. In advanced cases trembling very often comes on even when the patient has complete rest of body and mind. The disease sooner or later spreads, and other parts of the body become involved. Generally, as in hemiplegia, the arm is first affected, and the leg of the same side then follows, and later on it affects the arm and leg of the other side. Sometimes both legs are affected first, and the arms follow, but in this affection the malady often lingers for months and years, and is at last followed by constant and incessant tremblings of all the limbs, only followed by remissions during the day and their total absence during sleep at night. Even when the disease becomes fully established the muscles of the head and neck remain free, although the face presents a sad and vacant look. Where the head is seen shaking it is generally due to mere old age. In some cases the joints become distended. When the patient rises from his seat he tumbles forward without scarcely moving his legs from the ground. This mode of gait is known as *paralysis festinans*. In this affection the oscillations of the eyeballs are absent. The jaws move freely, only the tongue when drawn out is tremulous. The speech is unaffected for a long time. The respiration and deglutition are clear, and so far the affection is different from insular sclerosis. In advanced cases rigidity of the muscles occurs, and is followed by contractions. The rigidity is transient at first, but rapidly becomes permanent. The extremities and trunk now become implicated; the head is thrown forwards and fixed in that position. There is considerable deformity of the limbs. The patient often complains of cramps and traction of the affected muscles. The constant traction and fits of trembling prevent sleep and bring on exhaustion. The patient feels great difficulty in carrying

food to his mouth, and feels hyperæsthesia, or even heat over the whole body. The control over the bladder and rectum and the intellect are retained. At last the patient becomes bedridden, the nutrition becomes defective, there is defective intellect, with unintelligible articulation, great prostration, and bedsores. The patient soon becomes exhausted, and dies either convulsed, or from coma, or from delirium, or from lung complications.

*Duration.*—The disease lasts for a long time; in some cases for twenty or thirty years. Duration.

*Diagnosis.*—Paralysis agitans is distinguished from Scrivener's palsy by the fact that the agitation ceases on action in it and begins on action in Scrivener's palsy, and from all forms of cerebral paralysis, by the fact that the muscles remain under control of the will. Diagnosis.

*Treatment.*—The disease is generally incurable. Improve the state of general health by iron and various tonics, as strychnia, zinc, arsenic, nitrate of silver. As the pains from tremblings and cramps are severe, they may be relieved by sedatives. Warm baths, cold baths, and shower baths are of some service, and issues in the neck or to the back have done good in some cases. The constant electric current is of benefit. Treatment.

### ESSENTIAL CONTRACTION WITH RIGIDITY.

*Essential contraction with rigidity* is a primary affection. It occurs during infancy and childhood, and is said to be a form of excito-motor disturbance. It is often associated with, or follows, laryngismus stridulus or convulsions. It is an involuntary tonic contraction of the limbs, independently of any appreciable organic lesion of the cerebro-spinal axis. Essential contraction.  
Definition.

*Causes.*—It is common in children between one and three years, and is often due to reflex causes, as dentition, Causes.

improper food, and irritation of the genitals. It may also depend upon general debility and anæmia.

Symptoms.

*Symptoms.*—The child after a restless and uneasy night presents in the morning tonic contractions of both feet, the insteps are swollen and look smooth and polished. In anæmic cases the disease sets in with various nervous disorders, as headache and giddiness, which is soon followed by contractions of the limb. When the disease is established, the thumbs are flexed into the palms, and the flexed fingers conceal the thumbs. The contractions often affect the wrist-joints. The knees are rarely affected. The disease always intermits. The child complains of pain and stiffness in the affected parts, the muscles are hard and rigid, and extremely painful. The intelligence is perfect. There is restlessness and irritability. In fatal cases convulsions precede death. The disease may often go on for months, slowly increasing in severity. In many cases the disease slowly subsides, and at last recovery takes place.

Diagnosis.

*Diagnosis.*—It is often mistaken for contractions due to cerebral or spinal disease. In cerebral disease various disorders of intelligence and sensibility, fever, constipation, and vomiting precede or accompany the contraction. In essential contraction these symptoms do not occur. In cerebral disease the pulse is irregular, a single limb is generally affected, and the effect is always permanent. Essential contraction is remarkably intermittent, and begins in fingers or toes.

Prognosis.

*Prognosis.*—Is favourable when due to reflex causes; the occurrence of convulsions renders the prognosis serious. If accompanied with laryngismus stridulus it is favourable, if due to some permanent disease it is unfavourable.

Treatment.

*Treatment.*—Remove the cause, avoid violent remedies as leeching, calomel, drastic purgatives and blisters. Use warm bath every day. Belladonna, conium, bromide of

potassium, valerian, assafoetida, and musk are worth trying, and the general nutrition should be improved.

## DELIRIUM TREMENS.

### ALCOHOLISM.

*Delirium tremens* is a chronic alcoholic poisoning, and occurs in persons who are in the habit of drinking freely. It also occurs in persons who after drinking heavily have a weakened brain, and who have been further excited by mental troubles, or accident, or by extra amount of their accustomed drink. The disease is often manifested during the course of long-continued drinking or of occasional intemperance.

Delirium  
tremens.  
Definition.

*Causes.*—Is most frequent in males, and in those whose occupation exposes them to intemperance, as cabmen, commercial travellers, butchers, and public-house keepers.

Causes.

*Morbid appearances.*—The poison is rapidly absorbed into the stomach, and is eliminated by the skin, the lungs, and the kidneys, and even, when taken in very large quantities, the trace of it altogether disappears from the eliminating system in two or three days. In persons who die of alcoholic poisoning, the alcohol may be found in the liver and the brain. In persons long given to drink the membranes of the brain are thickened, and the convolutions are much shrunk, the subarachnoid tissue is opaque, and there is a large quantity of fluid in the sulci on the surface taking the places of so much good brain. In those cases where from excessive poison the patient dies in a few days, there is congestion of the brain, of the medulla, and of the upper part of the cord, and often degeneration of the brain substance. The respiratory organs are next affected, and we find congestion of the lungs. The liver is subject to engorgement, chronic inflammation, or to

Morbid  
appearances.



cirrhosis, to abscess, or to amyloid, or to fatty degenerations. The heart is occasionally degenerated.

Pathology.

*Pathology.*—The excess of alcohol in the tissues of the body leads to their disorganisation; their nutrition, and oxygenation becomes defective, and the tissues degenerate. On particular organs, its effects are to increase their connective or fibrous tissues, as in the liver and kidneys, in other instances a fatty degeneration as in the heart results. In such cases also the brain is atrophied. The blood contains 30 per cent. more of carbon than in health, owing to the hydrogen of alcohol taking away oxygen from the blood and leaving less quantity for the oxidation of its carbon, and hence less of carbonic acid is exhaled from the body; as a consequence fat is largely deposited into the areolar and muscular tissues of drunkards, and hence they are often fat and flabby.

Symptoms.

*Symptoms.*—The symptoms creep on gradually. The patient loses his appetite, becomes restless, has disturbed sleep, the mind becomes agitated, he grows suspicious and is inclined to quarrel, and feels low spirited. These symptoms continue for many days, when the actual affection declares itself. These relate to delirium, which is busy but not active, and is characterised by constant muttering, with hallucinations, and tremors of the muscles. The patient is suspicious of every one around him, and suffers from extreme prostration of body and mind. After several days and nights of sleeplessness, the prostration increases. In established cases there is profuse perspiration, a moist and clammy skin, a feeble voice, generally a pale face, often wild looking, the pupils are dilated, and the conjunctivæ are injected. To these are added a furred white tongue, soft and frequent pulse, great thirst, want of appetite, the urine containing more of sulphates and of urea, but less of phosphates, and the constipated bowels, with occasional pains in the pit of the stomach or in the right side

below the ribs. All these symptoms grow worse at night. The tremors are present, often limited to the head, neck, or limbs; the lips and tongue are also tremulous.

Besides tremblings there are involuntary startings of the limbs and the shaking of the muscles is chiefly felt on holding the limbs; the pulse at first may continue normal and may be soft and diastolic, but at a later period, and especially in unfavorable cases the pulse is small, extremely feeble, and is very frequent. The temperature in a majority of cases is about  $99^{\circ}$  to  $101^{\circ}$ , but occasionally it rises to  $106^{\circ}$  or  $109^{\circ}$ . Gradually the patient begins to wander, gives orders about his business to absent servants; is distressed or perplexed and suspicious of all around him. He is generally restless at night, and dreams are attended with hallucinations. At first the patient talks rationally as if nothing is the matter with him, only when he puts out his tongue he does so in a tremulous manner. At last he becomes incoherent and delirious. The delirium is peculiar; he feels as if rats were on or under his clothes, and robbers in his room, insisting upon getting into his bed. He is seldom quiet, keeps talking continually, his hands are tremulous his features constantly twitching; fits of phrenzy at last occur. He always tries to get out of bed, and if not watched may be found in the streets, but seldom harms himself or others.

In favorable cases recovery takes place; these symptoms are followed by a critical sleep, from which the patient awakes, though feeble, but quite refreshed. In fatal cases wakefulness continues. Pulse is  $140^{\circ}$  or  $150^{\circ}$  and feeble; the temperature of the body rises to  $105^{\circ}$  or to  $108^{\circ}$ ; there are persistent muscular tremors, even during sleep. The subsultus tendinum, the muttering delirium, followed by great prostration, coma, or epileptic convulsions, and bedsores point to a fatal termination.

In certain cases a sort of violent phrenzy is induced by

prolonged drinking; the patient generally takes alcohol in moderation, but only at intervals, he drinks continuously for a number of days. He is sleepless, there is violent delirium, but no hallucinations; he is shaky, but has no regular tremors. The face is flushed, the eyes bloodshot, head hot, and pulse small and firm. The bowels are irregular, sometimes constipated, sometimes loose.

Diagnosis.

*Diagnosis.*—Delirium of alcohol often simulates delirium of brain affections. Of *alcohol*, the history of alcohol, with horrid illusions and tremors of hands. The patient can be roused, and can answer questions rationally. The pulse is soft and easily compressible. If the patient can sleep the delirium is cured. In *brain affections* there is violent delirium. There is more tendency towards lethargy than towards excitement. The pulse is sharp, hard, and irregular. There is vomiting and severe headache, with increased sensibility to light and sound. The patient never jumps out from his bed, and is never bathed in sweats, nor ever has a low temperature. In delirium of *typhoid fever* there is no vomiting, no headache, but there is tympanites, and the delirium is of a low muttering kind.

Typhoid fever.

Acute mania.

Of *acute mania* there is neither fever, vomiting, headache, nor prostration. The delirium is violent, but is quieted during sleep, though often the patient is sleepless. In disorder of alimentary canal and lungs the delirium is mild. In cases of exhaustion and lowering diseases it is also mild, but low and muttering.

Sequelæ.

*Sequelæ.*—Delirium tremens is generally followed by the deposit of fat in the muscular and areolar tissues of the body. The drunkard also suffers from fatty infiltration and degeneration of the heart. The delirium of alcohol may end in chronic alcoholism, in acute mania, in melancholia with suicidal tendency, or in mania for drink.

Prognosis.

*Prognosis.*—Those cases are most unfavourable where the patients have indulged in excesses for a long time,

are old in years, enfeebled in constitution, suffer from Bright's disease or have cirrhosis of the liver, or have previously suffered from the same complaint. If they are unable to take any food, and cannot get sleep even though exhausted, the prognosis is grave. If the patient have convulsions, and the urine albuminous, the danger is very great.

*Treatment.*—The chief aim in alcoholic poisoning is to Treatment. check the exhaustion which already exists and to prevent its increase. This is done by such nourishment as arrow-root, mutton broth, and eggs. For sleep, opium and its preparations are highly useful, at the same time the patient should be allowed his moderate accustomed drink. In many cases the application of ice and cold douches to the head, and the internal administration of cooling drinks to soothe the irritated stomach are highly beneficial. Wet sheet packing is very beneficial in these cases. The bowels should be regulated. Bromide of potassium and hydrate of chloral; opium or belladonna, used by the mouth or hypodermically, may prove useful to restore sleep. Where exhaustion sets in, with violent phrenzy, large doses of digitalis have been given with success. Hot tea is useful in these cases. The natives of India try in such cases the rind of pear, apple, capsicum powder, or black-pepper tea, it causes vomiting and ultimately produces sleep. The patient should be restrained from violent movements and from getting out of bed by gently controlling him; no force should be used. The room should be dark but well ventilated. During convalescence some recommend strychnine and dilute nitric acid in small doses. Phosphate of zinc, nux vomica, various preparations of iron, mineral acids, and various vegetable tonics, are reliable remedies; oxide of zinc is used to procure sleep, to remove tremors, to relieve giddiness, and to destroy hallucinations.



## CHRONIC MERCURIAL POISONING. (PARALYSIS.)

Chronic  
mercurial  
poisoning.

*Chronic mercurial poisoning.*—When taken as medicine or inhaled by persons working under it, mercury gives rise to peculiar tremors. The mouth and the general system also become peculiarly affected.

Post-mortem  
appearances.

*Post-mortem appearances.*—There is no special lesion in any part, but mercury has been detected chemically in the liver, brain, and kidneys.

Symptoms.

*Symptoms.*—These have reference to the nervous and muscular system. The tremors come on gradually, and begin with the upper limbs and extend to all parts of the body, except the muscles of the eyeballs. Besides tremors there may also be noticed numbness, formication, tingling, and occasional pains in certain joints, as elbows, knees, feet, and thumbs. The movements are slight at first, and may continue so for years, or may soon pass into a convulsive variety. Sooner or later they extend to all parts of the system, and include the voluntary movements which are thus performed in a spasmodic manner. When the case grows worse the tremblings become constant, and the voluntary movements become helpless; the muscles of expression, of deglutition, of mastication, and of articulation are also affected. The patient cannot lift any object. Can only walk with jerking movements. The face presents various grimaces, and the utterances are indistinct. There are sleeplessness, delirium, convulsions, and coma. The tremors generally cease during sleep.

In a vast majority of cases the patients either have previously suffered from salivation, ulceration of the gums, foetid breath, colicky pains, disturbed bowels, and fever, or they present these phenomena with tremors above alluded to. Generally, after the disease becomes fairly established,

the patient becomes cachectic, and emaciated, and weak; and he loses his appetite.

*Prognosis.*—The disease in itself is not dangerous. Prognosis.  
When death occurs, it may be from extreme debility or from the effects of mercury on the gums or bowels, or from cerebral complications or other intercurrent disorders.

*Diagnosis.*—It is often confounded with multiple sclerosis and with paralysis agitans. The history and the detailed symptoms point to mercury. The tremors of the muscles of the head and trunk exclude paralysis agitans; in both there is a tendency to run forwards. There is absence of nystagmus in mercury, whereas in multiple sclerosis it is well marked. Diagnosis.

*Treatment.*—Try to remove the cause. Give up the occupation. The system should be purged of the poison by warm vapour or sulphur baths. Iodide of potassium internally, and nervine tonics, as nitrate of silver. Relieve tremors by anodynes, as opium. Galvanism may be applied to enfeebled muscles. Treatment.

#### SCRIVENER'S PALSY—WRITER'S CRAMP.

Scrivener's  
palsy.

In this disorder a single muscle, or part of a muscle, or a set of muscles, when habitually and frequently exercised for certain actions, becomes the seat of tremors. The disease occurs only when the specific or accustomed actions are performed. Under all other conditions the affected muscles apparently act fairly and seem healthy. There is a partial loss of controlling power.

*Causes.*—The disease affects pen-men, musicians, composers, seamstresses, and shoemakers. It never attacks persons under thirty years of age. The derangement is due to long-continued exercise of affected muscles and their consequent fatigue. Causes.

Similar conditions of spasmodic contractions of muscles may be found in any part of the body. Thus a tailor, a

fencing-master, or a turner, may become so affected that they are seized with spasms of the muscles which they habitually call into play.

Pathology.

*Pathology.*—The disease is due to abuse of the implicated muscles, which are tired out and degenerated from fatigue or extreme weakness. Their electric irritability is diminished.

Symptoms.

*Symptoms.*—The patient complains of fatigue and pain in the hand and forearm shortly after he has begun writing. The pain is especially in the thumb; very often in the muscles of the upper extremity; at first the fatigue or pain generally disappears after a night's rest. As the case progresses there is more unsteadiness of movement, and the patient while writing is obliged to rest for a time or to give more attention to the movement of his hand; he feels an uncomfortable burning sensation in the hand or forearm, with more or less aching. The thumb gradually becomes convulsively flexed, while the middle and index fingers are rigidly contracted. The writing, therefore, becomes more illegible, scribbling, and jerky, although, curiously enough, he can employ his hand quite steadily for other purposes. Very often the mode of writing is altered at the risk of the corresponding muscles becoming spasmodically contracted. If the patient take to writing with his left hand, it also becomes affected in the same manner as his right hand.

The affection of the muscles is sometimes paralytic, but in most cases spasmodic. Different muscles are affected in different cases. Occasionally the muscles of the hand and of the forearm are all involved. The paralysis is never absolute and the sensation is not at all affected.

Treatment.

*Treatment* consists in absolute and prolonged rest, sea air, nourishing diet, and plenty of food; a continuous current applied to the muscles of the arm and along the spine is serviceable. The strength of the current should be short. Liniments and douches may also be employed.

## SPASMODIC WRY-NECK (TORTICOLLIS).

Spasmodic  
wry-neck.

The disease affects both sexes alike, and is common in adults. There is pain or uneasiness in the neck for a time, and then constant jerking of the head follows. As the disease progresses the pain increases, and spasmodic contractions of the neck become more developed and more violent, and the head is habitually carried on one side. After a time the head and neck become permanently twisted. The spasm often extends from the head and neck to the muscles of the face, and to those of mastication, or to those of the shoulder or arm. The spasms, as a rule, cease during sleep or when the head is supported. In these muscles the electric contractility and irritability are increased. In torticollis, in some instances, the movements of the head are those of simple rotation. In others the head is inclined downwards to the affected side, and also backwards, the face is also rotated towards the diseased side, and the skin of the upper and back part of the neck is thrown into transverse folds. In some cases, where a portion of the trapezius is only implicated, the head is bent towards the diseased side, and is thrown somewhat backwards, but the face is rotated towards the sound side.

*Treatment.*—Torticollis may be treated surgically by division of the affected muscles, or medically by Faradisation and an alterative regime. Treatment.

## DIPHThERITIC PARALYSIS.

*Diphtheritic paralysis.*—Is a disease which comes on a few days or weeks after apparent convalescence from diphtheria. It is characterised by paralysis of the motor and sensory nerves. The part chiefly and most often affected is the soft palate. The patient owing to the separation of the false membrane has nearly regained his voice and power Diphtheritic  
paralysis.  
Definition.



**Symptoms.** of swallowing, when he begins to speak with a nasal tone, and on swallowing, his food passes into the posterior nares. The soft palate has also lost its motion and sensation. In a few days the patient further complains of tingling sensation and loss of motion in the limbs, and generally in the lower extremities, at first in one leg and then in both, the paralysis soon extending to the upper extremities and to the trunk, and the control over bladder and rectum being rapidly lost. The paralysis from the soft palate also rapidly extends along the track of par vagum and the muscles of mastication, of articulation, and also those of the larynx, lungs, and heart become affected. There is complete failure of sexual power and of appetite for food. The organs of special senses are equally affected, squinting or double vision is present, the taste and smell are perverted, and there is deafness. Temporary amaurosis is also common. Recovery is complete as a rule within three or four months, and the affection is rarely or never fatal except when it sets in during the acute stage of diphtheria.

**Treatment.** *Treatment.*—The patient should have perfect rest, tonics, nourishing diet, sea-baths and locally stimulating liniments, frictions and electricity.

Duchenne's  
paralysis.

### PSEUDO-HYPERTROPHIC MUSCULAR PARALYSIS.

#### DUCHENNE'S PARALYSIS.

**Definition.** It is also called progressive muscular sclerosis. It is a disease of infancy or childhood, occasionally hereditary, and attributed to the growth of connective tissue in the interstices between the muscular fibres. All the cases hitherto reported have been in boys.

Morbid  
anatomy.

*Morbid Anatomy.*—There is a gradual growth of interstitial connective and fibroid tissue among the muscular fibres, and in some parts fat is deposited. The muscles being pressed by these overgrowths often undergo de-

generative changes, their transverse striæ become indistinct and effaced, the longitudinal fibres are very distinct, and there is more or less deposit of fatty matter. The muscles first affected are those of the back of the legs, back of the thighs, and of the calves. In the beginning they are weak, not painful, subsequently they become enlarged and firm, and are never contracted.

*Symptoms.*—The child does not like to walk, and feels weak in the muscles of the back. The child stands with legs wide apart and shoulders thrown back; while walking he lifts his knee considerably and needlessly, the foot is more or less extended and the toes point downwards, and he also sways his body from side to side. The child continues in this state for months, when the muscles of the calves have become enormously enlarged; those of the calves increase rapidly in volume, and this is soon followed by atrophy of other muscles. The muscles of the back, of the trunk, of the arms, and of the face, often shrink, and those of the calves and of the buttocks increase in growth. With the enlargement there is an increased loss of muscular power, and the child is unable to walk, and if he attempts it he puts his feet very wide apart, the shoulders are thrown considerably backwards, and the swaying of the legs is very much exaggerated. The child cannot rise from the ground erect or without support, and then too he throws his buttock considerably backwards. This state of paralysis may last for a year or two, when the disease extends to the upper limbs. The child now becomes more and more helpless, loses all power in the lower extremities, and becomes bedridden. The child continues in this state for a very long time, as the respiration, circulation, and digestion are not impaired, but sooner or later complications occur and the child becomes prostrated, or death occurs from pneumonia. During the whole period there is no fever. At first the electro-contractility is unimpaired,

Symptoms

but later on, as muscular fibres undergo degeneration, there is loss of electro-contractility. In this affection the sensation continues perfect throughout, and the control over the bladder and rectum is also retained.

*Treatment.*—Application of electricity along the spine, and locally to the affected muscles, has been recommended, aided by baths, friction, and shampooing.

### NEURALGIA.

Neuralgia.  
Definition.

Neuralgia means some affection of a nerve whereby it becomes the seat of excessive pain. The pain is paroxysmal, and occurs in the course of nerves or in the area of their distribution, but not where the lesion affects the peripleural terminations of the nerve, or implicates its trunk. The pain may attack any sensory nerve, and is often referred to parts which have no sensibility, as the heart. Thus, tic douloureux is a facial neuralgia.

Complicated cases occur in which in any nerve inflammation and neuralgia exist together, and inflammation of the nerve fibres is the immediate cause of pain. In such cases there is not only pain but a sense of burning and coldness. Thus, periodical cephalalgia or sick headache is not a pure neuralgia, but in it the pain is probably seated in the cranial nerves.

Causes.

*Causes.*—It may be caused by any injury affecting a nerve; by pressure of tumours or other growths as take place in bony channels; by disease of nerves, as rheumatic or syphilitic varieties of inflammation; by morbid state of the sensorial nerve centre; and by morbid states of the blood, as cachexia, anæmia, and hysteria. A fixed pain may be due to local disease of a nerve or nerve centre; the radiating pain involves morbid condition of sensorial nerve centre; flying pains are due to blood poison, as of gout or of malaria. Neuralgia is often hereditary. Cases

occur where, though the disease may be severe and incurable, no cause whatever can be detected. In many cases severe neuralgias accompany diseases, and the pain is generally in some remote part. Thus, in hip-joint disease the pain is referred to the knee; in abscess in the liver to the shoulder; in calculus in the kidney to the testicle; in decayed tooth the pain is over the eyebrow. The pain occurs at different intervals, and increases in intensity at night. It may come on suddenly, and often disappears in a short time. It is always accompanied by muscular spasms, with excessive secretion or arrest of secretion, as noticed in the conjunctivæ or the mucous membrane of the nose or mouth. There are no signs of inflammation, but the affected surface often becomes red and congested, and frequently the arteries and veins of the affected parts become dilated. Malaria is often a cause of neuralgia. Other nutritive changes take place in connection with injuries and irritation of nerves. These are mostly seen in the form of vesicles of the skin, as bullæ or herpes. In the case of intercostal neuralgia, the eruption of shingles is an essential disease, and the pain is a symptom which accompanies it.

*Varieties.*—Different names are given to the neuralgias according to the sensory nerves involved. Thus, those supplying the viscera give rise to neuralgia of the heart, stomach, kidneys, testes, or mammæ. Those branches of the fifth pair of nerves distributed to the skin of the face lead to trifacial neuralgia or to tic douloureux. In hemi-crania, certain nerves about the head; in sciatica, the sciatic nerve; in angina pectoris, the cardiac nerves; in gastrodynia, the nerves of the stomach are affected. Varieties.

*Symptoms.*—They are of the most varied character, passing on from pain to spasm or paralysis. There is pain in the course or distribution of one or more sensory nerves. It may be continuous or paroxysmal; may vary from Symptoms.



slight tingling or feeling of burning and coldness to severe cutting pain, occurs suddenly, and is often attended with one or several repeated shocks; it is also liable to exacerbations and remissions. Very often patients scream or rave like madmen, and give loud shrieks. The attack generally commences with slight tinglings, which often increase to severe pains. If the part or the seat of pain be pressed, we notice tenderness in the course of affected nerves or their distribution. Very often tenderness may be only limited to certain spots, and those from observations have been determined to be parts from which the diseased nerve emerges as from a bony canal or through some dense fascia. These pains, when limited to a spot, can be relieved by firm pressure. Very often with pain there is associated impairment of cutaneous sensibility, and in many cases more or less sudden reflex movements, twitchings, or spasms. Thus, in pain in the toe, the leg is drawn up, in *tic douloureux*, the spasm of the muscles of the face occurs. Affections of sensory nerves lead to nutritive changes. These give rise to erythema, herpetic eruptions, occasional discoloration of hairs. Thus, in intercostal neuralgia, we find eruption of shingles. Neuralgias have a tendency to be unilateral or unsymmetrical; they also shift from place to place, and even from one branch of a nerve to another. Thus, in trifacial neuralgia the disease may shift to the occipital or to the brachial plexus. The health of the patient generally suffers. There may be some remote reference to gout, rheumatism, syphilis, hysteria, or malaria.

### TIC DOULEUREUX.

*Tic douloureux.*  
Definition.

*Tic douloureux*, otherwise called facial neuralgia, is the most severe form of neuralgia. It may affect the whole nerve or only a filament of either of the three chief branches

of the fifth nerve. The pain may be limited to the course of the nerve, or may by sympathy involve other nerves, and thus may be radiated from the original seat. It may be constant or paroxysmal; when paroxysmal it is of a most excruciating character. It may be felt over the forehead, eye, cheek, or jaw, and may be accompanied by lachrymation. Vesicles or herpes may accompany the attack. The morbid condition of the first or ophthalmic branch gives rise to pain in the forehead, which is a temporary complaint in hemicrania of megrim. The supra-orbital nerve gives rise to permanent neuralgia of a malarious kind, known as brow ague. In this the pain is at a point over the supra-orbital foramen. When the second or the superior maxillary branch becomes affected the supra-orbital nerve is the seat of disease, and we find excruciating pain shooting over the cheek, lower eyelid, alæ of the nose, and upper lip. In this the neuralgia may exist alone, or accompany that of the first. The third or the inframaxillary branch, or the infra-dental nerve, gives rise to pain in the lower lip, teeth, chin, and that side of the tongue. These pains are accompanied with muscular spasms. Sometimes the patient strikes his forehead with his hands, sometimes he chews his lips to relieve pain, at others the severity of the pain impels the patient to commit suicide.

*Causes.*—The disease is one of adult life, and is, for the most part, of life-long duration. The disease may often be traced to general debility; to blood poison, as from lead; to malaria; to exposure to cold; disordered digestion; disease of the bones of the face; to tumours or any organic brain disease pressing on the nerve; to hysteria; to carious teeth; or to exostosis of the roots of the nerve. The pains are usually burning or shooting, and so severe that they prevent all attempts at repose; but as a rule, they cease during sleep. Any sensory nerve may be the seat of

Causes.

neuralgia. Thus, sciatica is that which affects the great sciatic nerve.

### SCIATICA.

*Sciatica*, otherwise called hip gout. It literally means the hip. It consists of paroxysmal pain at the point of exit of the great sciatic nerve, extending along the course of it down the back of the leg and to the foot.

*Causes*.—The pressure on some part of the nerve by a tumour, malignant or otherwise (uterine), or of intestinal accumulations. It may be due to exposure to wet and cold, or to rheumatism.

*Symptoms*.—There is persistent deep pain near the tuberosity of the ischium, the pain shooting up and down the course of the nerve; it is increased on movement, on pressure, and on coughing, and there may be tenderness in the course of the nerve. It is occasionally followed by some degree of anæsthesia. The thigh may be slightly bent on walking. The limb wastes from want of use. Spasms, cramps, and local paralysis are very common. It is persistent and difficult of cure. It is more common in men than in women.

*Treatment of neuralgia*. *Treatment* of neuralgia generally. The indications are—  
1. Remove the cause. Thus, if due to malaria give quinine and arsenic; if to anæmia give iron; if to rheumatism or syphilis treat it accordingly; if due to pressure upon the nerve try to remove it. 2. Attend to the state of general health. 3. Prevent further attacks; for this purpose attend to hygienic laws, to the state of the alimentary canal, and to the presence of any diathesis; warm clothing should always be worn next the skin; salt-water baths twice or thrice a week are very serviceable.

*Of tic douloureux*. In tic douloureux opium in any form or its preparations may be given in large and repeated doses. Alcohol is often resorted to in these cases to relieve pain. Thus, hot brandy

and water often acts with benefit. The chloride of ammonium is a very useful remedy. In some cases quinine does good. The sesquioxide of iron and even tincture of gelsiminum are worth trying. Sleep may be procured by hydrate of chloral. Above all arsenic, although slow in its effects, is a very useful medicine. Locally : blisters, mustard plasters, and even liniments of aconite and belladonna, may be recommended. Many inject morphia hypodermically, but galvanism is a most potent remedy, and continuous current must always be used.

In sciatica all the remedies before mentioned may be tried ; if there be any symptoms of a syphilitic taint, they must be treated accordingly. In chronic cases some recommend division of the nerve, others blistering the cuticle, the part then being dusted with morphia. Many recommend issues, actual galvanic cautery, and even acupuncture ; others, again, apply direct sedatives locally to the part as belladonna, veratria, aconite, and opium. Tinct. Actæ Racemosæ with iodide of potassium may be recommended. Very often daily hypodermic injections of morphia and atropia are very valuable. Among the efficacious means may be named a continuous current of galvanic electricity, or Faradization repeated from time to time. In urgent cases, in order to relieve the pain, at once give inhalation of chloroform or ether.

#### CONVULSIONS IN GENERAL.

Convulsions.

In the chapter on paralysis we have already treated of tremulousness of muscles arising during voluntary efforts. We have also remarked that in paralysis the muscles become rigid and contracted. In this part we have to detail various convulsive movements which may arise without paralysis. Convulsions may affect a single muscle, a group of muscles, a whole limb, or the one half of the body, or the whole body. They may be slight or very severe ; may

Definition.



be paroxysmal or may be attended with exacerbations. When intermittent the convulsions are known as clonic contractions; the continuous ones are called tonic spasms. The slight forms are known as tremulousness, which generally cease during sleep and appear only when an effort is made to move the muscles; they depend on the transmission of voluntary impulse. These may be noticed in tremulousness of the orbicularis palpebrarum; that which attends subsultus tendinum in fevers, in paralysis agitans; or the trembling of mercurial poisoning, or of paraplegia. In the true form of convulsions no such impulse exists.

Tremulous-  
ness.

Clonic.

In hydrophobia the spasms are induced by an attempt to swallow fluids. In some forms of convulsions, as chorea, the spasms cease during sleep, but increase during voluntary efforts and under mental excitement. The convulsive movements attendant on epilepsy may, like chorea, attack a single muscle or a limb, or one half of the body or the whole body. In them the contractions are of clonic character, as known by violent and repeated alternate movements of flexions and extensions of different muscles. The tonic spasms occur where contractions are continuous, as best seen in the calves of the leg after fatigue, in contraction of muscles of the calf of the leg in cholera, in contraction of muscles in paralysis, in tetanus, and in strychnia poisoning. The morbid lesions which induce convulsions are like those which lead to paralysis seated in the nervous centres. The destruction of those centres which cause paralysis of the side opposite the lesion, if irritated, would cause convulsions in the same regions. Thus, clonic and epileptic convulsions, which are generally unilateral, are due to cerebral irritations; whereas in tetanus and strychnia poisoning the convulsions are of spinal origin, the lesion occupying the medulla oblongata as well as the cord. Where a single muscle or a group of muscles is convulsed, the lesion may be either in the nerve

Tonic.

which supplies it, in the nucleus of the nerve or in its continuity into the corpus striatum, or in the grey matter of the convolutions.

## ECLAMPSIA.

Eclampsia.

This subject is divided into—1. Convulsions in adults, as epileptic and puerperal ; 2. Infantile convulsions ; and 3. Hysterical convulsions. It is an alarming convulsive disease. The convulsions occur accidentally, and may depend on some specific lesion, or on the presence of some special pathological process. It comes on in paroxysms, produces distortion of the countenance, and is often attended with loss of consciousness. There are spasmodic movements of the muscles of the body. The disease may be slight and localised, may be unilateral or general, and is a most common occurrence in children. In children the twitching of muscles, the grinding of the teeth, peevishness, and restlessness should be looked upon as previous warnings.

Definition.

*Varieties.*—These are tonic spasms, clonic spasms, and both combined. *The tonic spasms.*—The word tonic literally means to strain or tighten. In this affection the contractions are partial ; the affected muscles are hard, but there is no loss of consciousness. They are best seen in tetanus and in the cramps in cholera. *The clonic spasm* literally means to put in commotion. The subsultus tendinum of low fever is an instance of this kind. Both are combined in the epileptic form of convulsions. In this disorder we find sudden loss of consciousness, with loss of voluntary motion. The fit lasts from a few seconds to ten or twenty minutes, and ends in exhaustion with tendency to sleep.

Varieties.

*Causes.*—These are known as centric and eccentric. *The centric causes.*—Direct injury to the head ; any irritation to the brain by effusion of blood ; any obstruction

Causes.

to the cerebral artery, morbid growths in the brain, cord, or their membranes; those circumstances which interfere with the proper supply of healthy blood to the nervous centres, as hæmorrhages, or in cases of animals killed in slaughter houses convulsions occur; circulation of poor, or poisoned, or unhealthy blood, as where proper oxygenation is impeded as in spasms of the glottis, or where the noxious gases are inhaled. The retention of effete matters in the blood as in renal diseases, urea being not properly eliminated. In children the retention of the poison of scarlet fever or of other infectious disorder is a cause.

Causes.

*Eccentric causes*, otherwise known as reflex or sympathetic, may be due to all the circumstances which lead to abnormal excitement of organs distant from the brain. Thus, teething, intestinal worms, and renal calculi provoke convulsions. Occasionally the pricking of a pin, the application of a blister, or a burn, by causing direct irritation, also leads to convulsions. Convulsions occur independent of any organic disease of the brain; thus, it may occur during childhood (dentition), during puberty (cutting of the wisdom tooth), or at the change of life.

Diagnosis.

Eclampsia.

*Diagnosis.*—Eclampsia differs from epilepsy. In *eclampsia* the fits are more frequently fatal from coma or from exhaustion. The fits cease as the cause is moved, they also become more frequent and more intense as the disease is a progressive one. They also occur irregularly. A history of syphilis, the existence of renal disease, the presence of brain mischief, the evidence of loss of blood, the parturient state all point to eclampsia. In *epilepsy* there is very often a sudden invasion, irregular and powerful contraction of the muscles; all the voluntary muscles may become attacked, the countenance is much distorted, the face is pale or livid, the eyeballs starting from their sockets and motionless, pupils are often insensible

Epilepsy.

to light and widely dilated. There is grinding of the teeth, protrusion of the tongue, often bleeding from its being bitten. In severe cases stertorous breathing, laborious respiration, and involuntary evacuations occur. When the attack diminishes the patient is lulled to sleep.

*Prognosis.*—Danger arises from implication of the respiratory muscles, or of the glottis from obstruction to cerebral circulation ; from want of sleep for a long period ; and from great exhaustion. Prognosis.

*Treatment.*—Trace its cause and remove it at once. If there be any reflex irritation, as worms, or teething in children, remove it ; if due to blood poison, to organic brain disease, or to rickets, or to tuberculosis, treat them accordingly. During the paroxysm the patient's dress should be loosened about the neck, and free ventilation allowed, restrain the movements in so far as to prevent injury to the patient. The inhalation of chloroform may be tried with care. Give also antispasmodics and keep the secretions free. Subsequently apply cold to the head, use warm foot baths containing mustard, and sinapisms to the extremities. The principal remedies used in these cases are antispasmodics and narcotics. It is important to procure sleep and to avoid suffocation and exhaustion. To prevent suffocation some try artificial respiration. To prevent exhaustion stimulants are useful. Treatment.

## EPILEPSY.

*Epilepsy* is a functional disorder of the nervous centres. Epilepsy.  
The term literally means a falling sickness. Is a paroxysmal convulsive attack of short duration, characterised by sudden temporary loss of voluntary power occurring at long intervals in which there is a sudden and complete loss of consciousness or some mental disturbance associated with clonic spasms of the voluntary muscles or with tonic convulsions, and followed



by profound sleep. The two main conditions are coma and convulsions.

*Causes.*

—These are various, Sudden fright, overwork of body or mind in persons whose brain is weak. The disease is often hereditary in families where the members are epileptic, insane or hysterical. In such families it is common to find one epileptic, another insane, a third suffering from chorea, the fourth an idiot, and the like. The predisposition for epilepsy is found in those who have during their infancy suffered from convulsions due to any reflex causes. The disease attacks males and females alike. and occurs most frequently between the ages of ten and twenty.

*Morbid anatomy.*

*Morbid anatomy* is quite obscure. Some believe it to be a functional disorder of the brain; and when organic derangements are present they are rather the effects of repeated fits than the cause. In opening the skull we find the pia mater more or less congested, there is disease of the blood-vessels, and softening or induration of the brain. In epilepsy the brain is successively anæmic and congested. The extreme pallor at the commencement of the attack points to anæmia of the brain, and great turgescence soon replaces the pallor. The vaso-motor nerves distributed to the cerebral vessels become disturbed in their functions. Some believe that an afflux of arterial blood, as in whooping cough or a morbid poison collected in the blood, acts upon the medulla oblongata and excites convulsions. Others are of opinion that epilepsy is due to the spasm of the cerebral arteries giving rise to anæmia of the brain, and thus causing epileptic convulsions. Some regard the medulla oblongata and upper part of the cord as the seat of the lesion in epilepsy. Others include the corpus striatum, the cerebellum, and other parts at the base of the brain. Some eminent physiologists have proved by experiment that division of the lateral columns of the cord between

the medulla and the tenth dorsal vertebra produces epileptic convulsions. It must be admitted that these convulsions are of spinal origin, and that the motor tract of the cord is chiefly involved. The implication of nerves at the base of the brain shows that motor nuclei are in the medulla oblongata and in the floor of fourth ventricle. The unilateral tendency of spasms in epilepsy points to the corpus striatum as the centre of motion. When we bear in mind that in epilepsy convulsions are the most prominent symptoms and that they are preceded by some aura, some sensation, some spasm, some hallucination, and are from the first attended with loss of consciousness or with total insensibility to surrounding impressions, it must be acknowledged that these phenomena must be due to some derangement of a limited spot of a cerebral origin. That from this spot it then spreads over the sensorium and annuls consciousness, and to other sensori-motor regions of the cerebrum to excite perverted actions. Thus, anæmia of the brain can be explained to be the consequence of the symptoms which accompany it, and the congestion which follows anæmia is the cause of clonic contractions. The after symptoms are due to carbonic acid poisoning.

*Symptoms.*—These are—1, premonitory; 2, those during the fit; and 3, those after a fit. The *premonitory* symptoms vary in duration from a few seconds to many minutes, or even hours. In some cases the fit is preceded by dulness and incapability to do any mental work, or by spectral illusions, confusion of thought or speech, or what the patient speaks of as an indescribable sensation of an inward working, noises in the ears, headache, giddiness, dimness of vision, or by that peculiar mental disturbance or premonitory blowing sensation known as *aura epileptica*. It is compared by patients to a stream of cold water, or a current of cold or warm air, or the creeping of an insect, the sensation commencing at the extremity of a limb or at

the epigastrium, and running up to the head. Directly the sensation reaches the head the observer would notice some pallor of the face, then a cry is uttered and a fit takes place, and there is loss of consciousness. In some cases there may be what is termed motor aura or sensory aura, recognised by twitching or palsy of some part of the body. In some cases there are hallucinations of the senses, and the patient sees or hears imaginary objects. *During the fit* the symptoms are divided into three stages. In the *first stage*, suddenly the patient utters a single loud piercing shriek, immediately after which the individual falls to the ground senseless and soon passes into violent convulsive movements, there is flexing of the fingers on the palms of the hands, and particularly of the thumb, the head is turned over one or other shoulder, and the arm describes a rotatory movement. There are tonic spasms and rigidity of the muscles of the head, face, and neck, attended with fibrillar movements of the muscles of the limbs and body, especially of one side; the eyes and lips are distorted, and the whole aspect is hideous, and respiration ceases; hence, the disease is called falling sickness. Unable to select a convenient place the fall may seriously hurt him. The neck is twisted, the teeth clenched, there is occasional biting of the tongue, foam gathering at mouth, twitchings of forehead and eyebrows, the eyeballs are turned up, and the pupils are dilated and insensible to light, the eyes partly open and shut. The skin is cold and clammy, the pulse small, and feeble, and quick; the chest is fixed, the respiration difficult and often suspended, the urine and fæces are often passed involuntarily. The face assumes a deadly pallor at first, but soon becomes livid and turgid. All these symptoms gradually abate, till shortly afterwards the convulsions cease. The patient, though unconscious of what has occurred, now takes a deep sigh, and appears as if in a sound sleep, and from which he awakes exhausted,

During the  
fit.

First stage.

and dull and stupid for some hours. Very often vomiting, and in many cases copious secretions of limpid urine, follow the attack. The duration of the attack varies from ten to thirty or forty seconds. The whole fit is made up of a number of attacks of convulsions alternated with relaxations.

*Second stage.*—In this stage the motor symptoms are more marked, there is increased lividity of the surface, and the face is bloated. In some cases, although the respiration is gradually re-established, unconsciousness still continues. The tonic rigidity of muscles now passes into clonic spasms, which are mostly unilateral, and there is distension of the veins of the head and neck and biting of the tongue. There are violent spasmodic twitchings about the face and limbs, the mouth is alternately opened and closed with violence, and there are hideous distortions of the features and eyeballs, and lockjaw, grating of the teeth, and foaming at the mouth. The tongue is got between the teeth and also bleeds, violent twistings of body and limbs in all directions occur, and there is alternate contraction and dilatation of the pupils, or they oscillate, there is laborious respiration, with gurgling in the throat, increased lividity and turgidity of the face, distension of the superficial veins, and even in some cases petechiæ in different parts from the smaller vessels giving way. The skin is warm and perspiring, there is violent action of the heart, involuntary passage of urine and fæces, very often vomiting or hiccough. The duration varies from a few seconds to two or five minutes.

Symptoms.  
Second stage.

*Third stage.*—In this stage the violent motor symptoms or convulsions cease, lividity disappears, but the patient is insensible or there is a gradual return of sensibility; the patient looks round, and tries to speak. The heart beats violently, and the patient is bathed in sweat. Either vomiting takes place, or a discharge of copious limpid urine, containing excess of urea, urates, and phosphates. The

Third stage.



patient now feels exhausted, is mentally confused, and complains of headache. He then passes into a heavy snoring slumber, with stertorous noise in breathing. The muscles are relaxed, and the patient feels weak for some days. In other cases he awakes with red eyes, headache, dilated pupils, and a stupid expression of face, often succeeded by other fits. Thus, he rapidly recovers, or remains maniacal or in a state of stupor for some time.

The symptoms show conclusively that there is a state of undue excitability of the medulla oblongata, in consequence of which consciousness and motor power are deprived paroxysmally of their controlling force. The irritation of the vaso-motor nerves of the brain, when arrived at a certain pitch, causes contractions of the meningeal arteries, whereby circulation in the brain is arrested and anæmia is brought about. This condition is the cause of loss of consciousness and convulsions. As there is tonic contraction of the arteries at first we find corresponding tonic convulsions or tetanic rigidity of the body. This is followed by clonic contractions of the arteries and clonic convulsions in the muscles of the body. The contractions are now followed by paralysis of the arteries, and we have the corresponding stage of exhaustion and prostration, and the fit ends. The circulation is now gradually re-established, and the patient recovers from the fit.

The frequency and severity of the fits vary. In some cases the interval may be above one month; in severe cases it is generally short. They may occur immediately one after the other, and by night as well as by day. The repetition of the fits often leads to melancholia or a sense of mental depression. Although not primarily fatal, gradually the health becomes undermined. When the fit is severe and lasts for a long time, it is known as *grand* or *haut mal*, and when slight for a few moments it is called *petit mal*, or epileptic vertigo. In the *petit mal*

there is only a momentary loss of consciousness, preceded by vertigo ; or the person stops in the middle of conversation for a few moments and then resumes his talk where he has left off, and is quite unconscious of the fit. In some cases there may be, with loss of consciousness, twitchings of the muscles of the face and neck, dilatation of the pupils, and pallor of the countenance, and one or two deep sighing inspirations before the patient feels all right again. In such cases the patient does not stagger or fall.

In some cases again, instead of momentary unconsciousness, there is only a feeling of sudden vertigo, and the patient soon clings to the nearer object ; and in a few seconds recovers himself, and there is no recollection of what has passed. These fits may be preceded by aura epileptica ; when often repeated they may end in dementia, or mania may take the place of the stage of stupor.

The epileptic patients seldom enjoy perfect health ; they suffer from headache, giddiness, confusion of mind, or derangement of digestion. They may suffer from dementia ; sometimes they suffer from partial paralysis or curious movements of the muscles of the body. The face is peculiar ; there may be pallor of the countenance, and a strange staring appearance of the eyes. With some the first fit may be the last, generally relapses occur. In some cases the recurrences are periodical, and occur during the day or at night or after a lapse of days or weeks or months. The fits grow less frequent, and decrease in force as the health improves. When fits occur at very long intervals they are apt to be repeated several times within a limited period.

Where the fits are liable to be repeated frequently they are generally not discoverable. They come on only in the night at the moment of going to sleep or at the moment of awakening. In the case of women they occur at the menstrual period ; females generally escape it during

parturition, when the puerperal eclampsia has a tendency to supervene. During the interval the patient seldom enjoys perfect health of body and mind, he often becomes low spirited and fidgety or excitable or weak minded. The patient is melancholic and fears those about him, he is often liable to outbreaks of passion, and will kill others or destroy himself. In some cases the patient becomes imbecile or idiotic.

**Prognosis.** *Prognosis.*—A patient rarely dies in a fit, but epileptics are not long-lived. They are apt to die of lung diseases, and to suffer great risks from the suddenness of the attacks; thus, they may fall into a fire or into a well, or may drown while bathing, or be choked while eating.

**Diagnosis.** *Diagnosis.*—When the fits occur at night time the diagnosis is a matter of extreme difficulty, but the patient may awake with uneasiness or confusion of mind, or the tongue may be sore, or that there is blood upon his bed-clothes, or he has passed his urine or fæces in bed, or he has hurt himself. It may be confounded with apoplexy or with hysteria.

**From hysteria.** Hysteria often occurs after painful emotions, after maltreatment of children by parents, or of wives by husbands, from terror of seeing disgusting objects, or witnessing a fit. Epilepsy occurs without any cause. The starting-point

**Cause.** in hysteria is the epigastrium. In hysteria the patient has choking and she screams, and can be roused by loud voice, or by dashing cold water, and the patient is much

**Warning.** more noisy. In epilepsy, without warning or with an aura starting from the limbs, and there is a single cry or none at all. In hysteria there is want of utter loss of consciousness, and it is preceded by globus and a feeling of suffocation. In epilepsy it is sudden. In hysteria the fit occurs while the patient has company and time to find a suitable place upon which to fall. In epilepsy he is alone and falls down as if struck by lightning, and hurts himself. In

**Place and company.**

**Characters of convulsions.**

hysteria convulsions are rarely tonic and rarely unilateral,

the patient throws the arms about, and they last at least fifteen minutes or even longer ; they are general and extensive. In epilepsy they are a sort of tetanus, and scarcely last more than two to five minutes, and are unilateral at first. In hysteria at the end of the attack the patient cries or sobs. In hysteria the face is not distorted. In epilepsy the face is much and hideously distorted. In hysteria there is no biting of the tongue, the eyelids are closed and resist when raised, and tremulous, and the pupils respond to light. Not so in epilepsy. In epilepsy he falls into a deep coma, or recovers consciousness at once, and feels shaken and exhausted. In hysteria after the attack urine is passed in abundance, pale, inodorous, and tasteless, and of sp. gr. 1000 ; the large quantity is owing to the spasm of the capillaries of the skin throwing additional work on the kidneys. In epilepsy no such thing occurs. In hysteria respiration never ceases, but is noisy and irregular. The skin is hot and perspiring. There is no lividity of the face. In epilepsy the respirations often cease, and there is no lividity of face. In hysteria the patient does not discharge urine and fæces without control. Not so in epilepsy. Hysteria never leads to impairment of intellect, or to dementia, as is the case with epilepsy. In hysteria the temperature rises only to 99° or 100°. In epilepsy it often rises to 103° or 104°.

*From ordinary syphilitic epilepsy.*—In syphilis the pain becomes worse at night, and there is presence of nodes. In the interval of the fits the patient complains of headache, giddiness, faintness, with irritability of temper. There is also a history of syphilis.

The epileptic seizure may be mistaken for the coma of apoplexy. In both there is a sudden fall, with possible injury as its result. This fact at once serves to exclude cases of opium poisoning and of drunkenness. For in both the patient sinks to the ground in a safe and com-

Duration.

Condition of face.

Termination

Characters of breathing.

Sequel.

From syphilitic epilepsy.

Coma of apoplexy.



fortable manner. The apoplectic patient is usually less violently convulsed than the epileptic, while after the convulsive period his coma is deeper. In epilepsy the pupils are equal or dilated, in apoplexy some difference can usually be detected. In apoplexy other symptoms of hemiplegia may sometimes be found, as, for example, looseness of the muscles of the cheek of the affected side. In opium poisoning the pupils are very much contracted, and there is often a smell of opium in the breath, just as in drunkenness there is the smell of alcohol. The epileptic patient cannot be aroused in the convulsive stage; the apoplectic may sometimes, but with great difficulty; while in drunkenness and opium poisoning persevering inquiries are at last answered. Uræmic convulsions, as has already been mentioned in uræmia, exactly resemble those of epilepsy, except that in epilepsy there is preceding congestion of the face which is absent in uræmia. In mania there are convulsions but no aura, and the attacks do not occur momentarily, and there is profound coma or lethargy following. Where fits are due to cerebral diseases there are other cerebral symptoms to denote the cause.

Opium  
poisoning.

Uræmic  
convulsions.

Mania.

Treatment.

*Treatment.*—During a fit. Prevent the patient injuring himself, remove all sources of pressure from his neck, and put something between the teeth. If the fit continues use those measures recommended in cases of hysteric fits. If there be danger of asphyxia remove blood by leeches to the temple. It is said that in cases where the fit is preceded by aura epileptica, a ligature between the region from which the sensation starts and the trunk prevents the attack. If the head is hot apply cold, if the feet are cold apply warmth. Some recommend chloroform, but it leaves the person more stupid and afflicted afterwards. A persevering use of half-ounce doses of tincture of hyoscyamus, judiciously given, produces marvellous results. Some recommend nitrite of amyl in these cases.

During the interval we must ascertain the source of the mischief, and if possible remove it, improve the state of general health by iron, cod liver oil, and baths, and give tone to the nervous system. Mineral tonics are very useful in these cases; so are phosphorus and bromide of potassium. Some recommend vegetable tonics, as conium, belladonna, and digitalis in large doses. The continuous galvanic current has a sedative action and is indispensable. Care should be taken to bring on a refreshing sleep. The diet should be simple, nutritious, given at regular hours, with a moderate quantity of stimulants. The patient should have daily exercise, early hours for sleep, shower-baths, and a quiet occupation; attention to the secretions is necessary. When the affection depends upon syphilis, treat it accordingly. Remove distant sources of irritation, as uterine derangement in females and phymosis in males, by surgical treatment. Drugs highly prized are atropine  $\frac{1}{240}$  gr., and continued for months, and bromide of potassium. Some recommend counter-irritation, as cupping, blisters, leeching or setons or issues behind the neck, or cold or shower-baths, or ice to the spine. Occasionally the disease may be arrested by various causes; often simple and trivial causes, as placing a ligature round the arm, stays the attack, sometimes a blister to the part where the aura has commenced also checks it. Very often the fits are arrested by the invasion of other morbid conditions, as typhus fever, erysipelas, or rheumatic fever.

#### ECLAMPSIA OF PREGNANCY.

This is characterised by a sudden fit of violent tonic and clonic spasms, with complete loss of consciousness, ending in profound coma. The attack may come on during gestation, during the last three months of pregnancy, or just at the time when the labour is commencing, or in a few

days after labour. First pregnancies are more liable than multipara. Probably in every fifty pregnant women, if albuminuria from pressure of the womb upon the renal veins be present, in ten of them convulsions occur.

Causes.

*Causes.*—It is due to blood poison (uræmia) from organic diseases of the kidneys attended with albuminuria; to cerebro-spinal irritation of the uterus; to cerebro-spinal congestion; or may be connected with efforts or pains of labour itself, or may be due to cerebral anæmia. The urine is albuminous for some weeks previous to the attack, and the urea is proportionately scanty.

Symptoms.

*Symptoms.*—The patient has, for some time previous to the attack, her face, arms, and hands œdematous. In many cases only the feet and ankles swell. There is also premonitory headache, dimness of sight, pain in the epigastrium and œdema of the labia, and the patient is at last seized with convulsions. The fits occur in rapid succession several times during the day, and last from half an hour to two or three hours, the patient being insensible throughout. When the symptoms abate the consciousness returns partially, and she complains of dull headache. When the fits occur during or before delivery the labour is often premature, and the child is always born dead. Mortality is on the average 30 per cent.

Treatment.

*Treatment.*—During my practice in Bombay the inhalation of chloroform, for from a few minutes to three and thirty hours, continuously administered under the guidance of a medical man, has met with good results. Large doses of hydrate of chloral as well as bromide of potassium may be given if the patient can swallow. If the attack occurs during parturition, the labour may be expedited by forceps or by turning. During gestation, if there be headache with a full pulse, use bleeding from the arm and favour free secretions from the kidneys. Indian women have the habit of taking blood from the arm of women during gesta-

tion, and in them the cases of convulsions are very rare. The injection of morphia under the skin is only useful in the puerperal state, either reflex or congestive, but not uræmic, but it should be followed by chloroform inhalation. In desperate cases large doses of tincture of veratrum viride have been given.

## INFANTILE CONVULSIONS.

Infantile  
convulsions.

Convulsions are most common in infants owing to the infancy being a most excitable period of life—a period exposed to peculiar sources of irritation. The convulsions are due to causes which in adults would lead to delirium or rigors. They are less serious in infants than in adults. When convulsions recur frequently, they are likely to weaken the intellect, to impair health, and in some cases to cause death. In a baby suffering very often from flatulence and indigestion, convulsive movements occur slightly, the child lies as though asleep, rolls its eyes about, moans, breathes with difficulty, and has twitchings of the muscles of the face, and a livid ring about the mouth.

*Causes.*—Convulsions arise in children during teething, may be developed in the course of diarrhœa, in bronchitis, or other affections of the respiratory tract. The invasion of scarlet fever is often preceded by convulsions. It may depend on mere anæmia, as in rickety children, upon organic disease of the brain, on insufficient supply or supply of impure blood to the brain, on reflex irritation, as constipated bowels, worms, teething, fright; it may occur in the course of many acute and chronic diseases, as fever, whooping-cough, and acute meningitis. Sudden drying-up of eruptions on the scalp, and thrombosis in cases of chronic diseases bring them on. Children born of parents who marry too early or at too advanced an age, and children of epileptics, are more liable to suffer from this complaint.

Causes.

Symptoms.

*Symptoms.*—Convulsions in children resemble those in



adults. They are equally frequent and violent, and may be insidious. The child is restless or forgetful, or grinds its teeth during sleep. During the fit the child utters a short cry without any previous warning, stares vacantly, loses consciousness, the respiration is momentarily suspended, the body becomes stiff and immovable, the hands are generally firmly clenched, the thumbs are turned inwards in the palms, the head is thrown backwards or forwards, or laterally; the countenance is rendered frightful, muscles of the face roll violently and rapidly, the jaw is in continued motion, the lips are drawn in all directions, the face becomes red and livid, the eyeballs roll and start, the pupils are dilated and insensible to light. There is often convergent strabismus. The pulse is frequently small, the breathing irregular and laborious, and there is an involuntary passage of urine and fæces. The paroxysm lasts from a minute to four or five minutes, and in some cases much longer. In favorable cases gradually the limbs and features relax, the lips assume their healthy colour; the child taking a deep inspiration, cries, or falls into a sound sleep, during which it gets bathed in perspiration. The fit is rarely single. In unfavorable cases usually there are many fits, which return at short intervals, and the patient sinks under coma and dies. When the attack is feeble the fit lasts longer; sometimes it is continuous for hours. Very commonly there may be only two or three fits during the day. Sometimes the movements are confined to one side or to certain muscles. The eyes, though open, show no sign of sight, and do not wink on passing the finger over them. These are most serious cases, and as a precursor of epilepsy in children, nodding of the head, called *eclampsia nutans* or *Salaam convulsions*, occurs. Sometimes the fits are slight, and these may be only threatenings of fits, either when the child is awake or asleep, or there is only spasm of the thumb over the

palm of one or of both hands. Frequently there may be spasm of the glottis or of the respiratory muscles, as occurs during whooping-cough. Fatal cases are those where the respiratory organs are implicated, and where the fits are very frequent, keeping the child comatose for a long period. Death takes place from asthenia or from slow asphyxia. Very often they lead, as in adults, to permanent hemiplegia or to failure of intellect or to idiocy. Stammering and squinting often indicate those cases who in early life had convulsions.

*Treatment.*—The health must be improved, all sources of irritation removed, bronchitis and diarrhoea must be attended to, and if the gums are congested lance them at once. During the fit loosen the clothing about the neck and chest, admit plenty of fresh air; a warm bath and cold douche to the head will be beneficial if the patient be strong and his pulse of good volume. Treatment.

### CHOREA. ST. VITUS' DANCE.

Chorea.

*Definition.*—The term signifies dancing or jumping, accompanied by singing. The complaint is a convulsive disorder of early life, and is characterised by restlessness and irregular, violent, and ludicrous actions or movements of voluntary muscles of the face and limbs without any control of the will. These are usually unilateral, but soon become general and subside in a few weeks. Owing to these involuntary jerking movements the complaint is also called insanity of the muscles. Definition.

*Causes.*—*Predisposing*: It is common among boys and girls. Children of nervous, hysterical parents suffer more than others. It is common between the ages of five and fifteen, or from second dentition to puberty. It is often hereditary. Previous attacks, chlorosis, bad living, and unfavorable hygienic conditions favour its production. A recent attack of rheumatism in children and a cardiac Causes.

disorder, such as either mere irregular action or anæmic murmur at the base, or a distinct organic systolic murmur at the apex of the heart, or an embolus in some part of the cerebral circulation, often precedes or co-exists with chorea. *Exciting*: Fright, or blows, or falls, by which the stability of the nervous system is disturbed, often reflex irritation of worms, or carious teeth causes it.

Pathology.

*Pathology* is quite obscure. Some regard it as due to perverted functions of the nervous centres, that these choreic movements are referred to the impaired nutrition of the ganglia at the base of the brain, namely, the corpus striatum and the optic thalamus. The unilateral commencement of the disease points to a lesion in the crus cerebri, of the corpus striatum, the optic thalamus, or of the cerebral hemispheres. But it must be remembered that in any lesion of one or other of these centres paralysis results, and the muscles of the eyeballs and those supplied by the facial nerves escape. In chorea these muscles are chiefly involved. Again, in chorea the disease soon extends to the opposite side of the body and does not affect deglutition and respiration, which is the case with cerebral lesions. Frequently chorea is said to occur from embolism of the cerebral arteries supplying the corpus striatum, optic thalamus, and the convolutions. These nerve structures are thus ill nourished, and they lead to undue muscular excitement. The convulsive movements have a close resemblance to locomotor ataxy, and might as well point to lesion of the posterior columns of the cord. We well know that in diseases due to affections of the cord there is no unilateral paralysis, and in them the impairment of motion implicates one side, while that of sensation the other. In chorea the impairment of motion and sensation attacks the same regions. In cases where rheumatism or valvular disease of the heart exists with chorea, we find scattered patches of congestion and softening of the nerve

centres, owing to the recent fibrinous coagula washed off the valves, and found as emboli into the vessels of the brain. Very often chorea may result from other causes, as fright, or reflex irritation, or powerful mental shock, and in these cases the heart is perfectly sound.

*Morbid anatomy.*—The arteries of the brain and cord are found dilated, there is exudation in the tissues surrounding them, with here and there patches of sclerosis and blood clots. As chorea is often associated with rheumatism and heart disease it may be inferred that the hyperæmia of the nervous centres may be due to rheumatic conditions, as well as to mental and reflex irritations. The sclerosis explains the complications in chorea of muscular wastings, rigidity of the limbs, and permanent paralysis. *Morbid anatomy.*

*Symptoms.*—The symptoms of chorea are partly intellectual, partly emotional, partly referable to the functions of voluntary muscles, to cutaneous sensibility, to nerves which supply muscles of deglutition, respiration, speech, and the heart; thus, they are connected with the cerebral convolutions, with the ganglia at the base of the brain, with the pons, the medulla and the cord. The affection is known by a peculiar, persistent involuntary movement of various muscles with clonic spasms; the control of the will over muscles and over their co-ordinating power is greatly impaired. The disease sets in insidiously. At first the patient is restless and fidgety, cannot keep quiet, jerks one of the limbs, cannot keep it in the same position for any length of time, and drags one of the legs in walking, performs various acts awkwardly, and drops or breaks things, as if he is unable to retain anything within his grasp. There are absurd, disorderly, involuntary movements, which are not very painful, but are very uncomfortable. They are mostly unilateral, sometimes in the head and face, and sometimes in the arm. After a variable time the movements become *Symptoms.*



universal, and the muscles are moved in all directions, the tongue is thrust into various movements, the shoulders are shrugged up, and the legs are less affected than the arms. Where the disease is associated with rheumatism, the choreic symptoms are sudden, and are general from the beginning. These also become intensified under emotion, or by attention being drawn to them. During sleep they cease. The patient has power, but there is want of control over the voluntary movements, as seen in walking, in catching hold of anything, or in putting anything into the mouth. The articulation is indistinct, deglutition and mastication are imperfect, and the tongue is protruded with a jerk and drawn back with a sudden snap. Consciousness is not affected. Looking at or drawing attention to the patient increases the irregular movements, but the sphincters are unaffected. Owing to the great muscular efforts a sense of fatigue and nervous exhaustion is experienced. Anæmia is a prominent symptom. The pulse is feeble, the temperature normal, the digestion is deranged or weak. Bowels are confined. Anæmic murmur, resulting from irregular muscular action, is common in these cases; it is usually not very loud or harsh, but only irregular, being heard at one time and not at another, and disappears as the patient improves. Throughout the attack there is no fever.

Duration.

*Duration* is generally from four to six weeks. The attack may be mild or severe.

Prognosis.

*Prognosis*.—Seldom fatal, except when it occurs in young, pregnant women. In such cases it is attended with fever and spasms preventing sleep, and often leading to exhaustion. In the severe form the movements continue for months, and there are relapses. The spasms are incessant, the patient has no sleep for several nights, and grows anæmic, both from want of sleep and from violent choreic movements; the spasms also prevent the efforts at

swallowing. The patient thus becomes exhausted, both bodily and mentally, and dies from exhaustion. In fatal cases the evacuations escape involuntarily, and partly from their irritation, and partly from constant movements, bedsores rapidly form over the elbows, hips, and sacrum. Death is preceded by delirium, or may be due to erysipelas, or to heart disease. Recovery in the vast majority of cases is complete.

*Treatment.*—The disease often gets well spontaneously Treatment. in a few weeks. The plan recommended consists in getting rid of any cause, or of reflex disturbance, as worms and teething. Attend to the secretions, and to the state of the digestive system. Improve the condition of the system generally, and of the blood; and attend to hygienic laws. Thus, tonics with antispasmodics and purgatives are highly beneficial. Cold douches and hot water to the feet also do good. Salt bathing; gymnastic exercises may be recommended. Separate a child with chorea from other children, both for the annoyance and their curiosity, and for its extension to them by sympathy. Arsenic in any form acts with benefit in obstinate cases. Calabar bean has been recommended. When the movements are so violent as to cause exhaustion and continued sleeplessness, opium may be given with antimony, or chloroform inhalation for the protracted cases. Some recommend iron, zinc, iodide of potassium, or phosphorus; also various vegetable drugs, as turpentine, strychnia, belladonna, cannabis indica, and opium.

### HYDROPHOBIA. RABIES.

Hydrophobia.

Is a poison said to be received from dogs, wolves, foxes, &c. It signifies water dread. It is said to be communicated through the saliva of rabid animals by inoculation only to other animals and to human beings. Definition.

*Causes.*—It is a specific poison which resides in the Causes.

secretions of the mouth, and of the salivary glands. The disease may be epidemic or sporadic. The poison acts only when applied to the denuded skin.

Post-mortem  
appearances.

*Post-mortem appearances.*—Rigor mortis is of long duration, there is hypostatic congestion of the lungs, and of all dependent parts as the posterior parts of the larynx, œsophagus, pharynx, and the brain. A considerable amount of lymph is found deposited on the mucous membrane of the larynx and pharynx, and the bronchi contain frothy mucus.

Pathology.

*Pathology.*—The poison is contagious, produces at first some peculiar alterations in the blood; subsequently it affects the nervous system. It acts as a ferment only so long as it is lodged in the wound and in the blood. The poison acts on the sensory nerves of the brain.

Symptoms.

Incubation.

*Symptoms.*—The wound heals rapidly, and there is a period of *incubation* before the poison shows itself. This period varies from thirty days to twenty months, and varies with the age and constitution of the patient, and depends upon the virulence, and upon the quantity of the poison introduced into the system. The period is shorter in young persons than in adults, and in old age.

Invasion.

*Invasion.*—For a day or two before the outbreak of the disease, a peculiar pricking sensation is felt over the site of the cicatrix, accompanied with restlessness, depression of spirits and disturbed sleep. The pain often extends in the course of the sensory nerves. This stage is often known as the *melancholic stage*, and may be characterized by great anxiety, feverishness, shiverings, pain in the epigastrium, great thirst and want of sleep. The patient is pale, anxious, very restless and indisposed to work or talk. The pulse is very frequent, there is loss of appetite, often nausea, followed by vomiting, with disinclination to swallow fluids, the respirations become hurried, and there is tendency to priapism and seminal discharges. All

these symptoms are, sooner or later, followed by a *stage of excitement*, during which the patient complains of cramps in the muscles of the pharynx, and of the thorax, or in the diaphragm. The patient looks wild and suspicious, but though inclined to be talkative like a maniac, he is quite sensible. He has also hallucinations, and often attempts to injure himself or others. He has great thirst but no inclination for fluid, his mouth and fauces are dry, and there is a constant flow of viscid saliva which he spits or hawks about with a noise resembling a bark. After a time the disinclination merges into dread and he cannot swallow fluids of any kind. While attempting to drink, he often makes a sudden gulp but without swallowing any fluid, and ejects spasmodically from his mouth whatever he has taken into it. During the act, the muscles of deglutition and respiration are thrown into violent spasm, attended with general tremors or shudderings. These paroxysms are often revived by even the sight of fluid. Very often the skin becomes so sensitive that even the weight of his bedclothes throws him into violent spasm; in many cases a draught of cold air is enough to produce the same result. With all these dreadful symptoms sexual excitement continues, and he passes urine frequently. As the case advances there is great restlessness and mental anxiety; the patient feels very feeble, the skin is cold and clammy, the pulse small, irregular, and frequent; his voice is hoarse, there is a constant supply of saliva, which is ejected in all directions, and which often contains small animalcules, which lively imagination has pictured to be the puppies of dogs. The whole muscular system contracts spasmodically, and there are convulsive tremblings; there are also snapping motions made with the jaws which resemble the bitings of a dog. This state continues from a few hours to two or three days, when paralysis sets in. The respirations are more hurried. At length the patient becomes

Stage of  
excitement.



delirious, and dies either of sudden asphyxia or of exhaustion.

Pathogno-  
monic  
symptoms.

*Pathognomonic symptoms.*—There is increased sensibility of the skin and of the senses generally, and attempts to swallow liquids are attended with pain; spasmodic contractions of the muscles of respiration and deglutition are felt, and there are restlessness, sleeplessness, and tendency to commit insane acts.

Prognosis.

*Prognosis.*—Is always unfavorable. Death is common in two to four days.

Treatment.

*Treatment.*—Few satisfactory results have been obtained. Still attempts must be made to remedy the evil by at once excising the wounded part, the immediate surrounding raw surface to be destroyed by caustics, as nitric acid, acid nitrate of mercury, nitrate of silver, or potassa fusa. The hyperæsthesia may be relieved by narcotics and anæsthetics. Prevent the patient from hurting himself, and also avoid further inoculation by his saliva of any wounds.

## HYSTERIA.

Hysteria.  
Definition.

*Hysteria* is defined to be a nervous disorder assuming the most varied forms, but commonly presenting a paroxysmal character; the attack usually commencing with a flow of limpid urine, with uneasiness and irregular motions, and rumbling noises in the left iliac region, or the sensation of a ball (*globus hystericus*) rising upwards to the throat, frequently attended by a feeling of suffocation, and sometimes with convulsions; chiefly attacking females from the period of puberty to the decline of life, and principally those possessing great susceptibility of mental emotions. It is rare or unknown among the ignorant and working classes of India, whose sensibilities are blunt, and is most common in those whose luxurious habits and ungratified desires are an immediate attendant. The

name has its origin in the uterus, although the complaint is seen in the male sex also. It is said to be owing to nutritive derangements of the entire nervous system.

*Causes.*—*Age.*—It generally occurs from fifteen to twenty-five years of age because of the radical change the nervous system then undergoes, but may occur in childhood and in advanced age. As age advances it becomes more rare, because the mind is more settled and less influenced by sudden emotions and impressions. *Sex.*—Females are more predisposed to it than males. This is due to the different ways in which the two sexes have been trained and educated. Widows, married women without children, and single women are most susceptible to it. Prostitutes, although indulging in excessive sexual intercourse, are generally exempt from it. Many attribute it to disordered menstruation and various diseases of the uterus, but its frequency in women as due to these causes has been very much doubted. In some cases it can be traced to derangement of the alimentary canal with long continued constipation. In girls who are over petted, who lead an idle, luxurious, or fashionable life, read amorous tales, whine for lovers, or cherish an ardent longing for a particular object, the affection is very common. It is not confined to any climate or country, and those living in towns suffer as often as the country people.

*Symptoms.*—Hysteria may be acute or chronic. The acute form is rare. It is often seen in India in strong plethoric girls, and is ushered in by severe convulsive fits, followed by violent dyspnœa, or delirium, or profound anæsthesia and fever. There are severe headache, dry tongue, very frequent pulse, and temperature  $100^{\circ}$  to  $102^{\circ}$ ; it is often mistaken for meningitis or typhoid fever. Chronic forms are very common.

The symptoms are divided into those of the hysterical fits, and those of the hysterical state. The clinical phenomena

Causes.

Symptoms.

Symptoms of the fit.

during the fit or during the paroxysm are arranged as those affecting the *mind*, the *sensibility*, *motion*, and *visceral actions*, and those symptoms which simulate *organic disorders*. *Mental*.—Extreme talkativeness or complete silence, depression of spirits or shedding of tears are often succeeded by unchecked laughter. Illusions and hallucinations are common. *Sensibility* is increased. There is acute pain under the ribs or in the knee, and increased on handling but not on firm pressure. Organs of special senses are also acute. *Motion* is diminished, and there is anæsthesia of the skin, but no numbness. There may be paralysis or tonic or clonic spasms. Thus, there is loss of voice or paraplegia. Tonic spasm affecting the pharynx leads to globus hystericus. Clonic spasm simulates chorea or epilepsy. *Viscera*.—Digestion is impaired or lost. The urine is often voided unconsciously, and in large quantity.

As a rule, the fit does not come on during sleep, and occurs only when witnesses are present. There are convulsive movements of the trunk and limbs, beating of the breast, tearing of the hair, violent screams, gesticulations, or feeling of globus hystericus. The attack ends with tears, outburst of crying, or obstinate hiccough. The patient looks apparently unconscious, but is aware of what is going on around, and looks out from under the eyelids occasionally. The fit may last only for a few moments; there is no stertor, no lividity of the face, no dilatation of the pupils, although the eyes are turned from side to side. The pulse is generally quiet, and there is no biting of the tongue, and no foaming at the mouth. The fit ends in exhaustion, and the patient falls for a time insensible. The attack is followed by a copious discharge of pale, watery urine, or abundant eructations of wind. In some hysterical subjects the appetite becomes disordered, and improper and indigestible substances, as hairs and lumps of earth, are greedily devoured instead of wholesome diet.

Very often weak young girls, wishing to make themselves objects of pity and wonder, thrust needles into various parts of their bodies, pass various substances into their vagina, and even pretend to live without any nourishment.

*Pathognomonic symptoms of the hysterical state.*—In hysterical patients the *emotions* are unduly excited, and will and intellect are defective. They are readily excitable, and indulge in exaggerated notions of their complaint. Thus, some believe that they are paralytic and cannot stand, but when off their guard they can do so perfectly well. They are either extremely cheerful or most despondent, and often talk a great deal of nonsense. With some the *cutaneous sensibility*, as well as the function of the *special senses*, are very much exaggerated. Thus, the slightest touch would produce the most agonizing pain, but by distracting the patient's attention all sense of tenderness is lost. The sensation of choking, known as *globus hystericus*, or a feeling of constriction as of a ball in the throat, either fixed there or ascending upwards from the pit of the stomach, is often complained of. In these cases the temperature is occasionally reduced, the bladder and rectum often leading to great accumulation of urine and fæces without the patient's knowledge. In such patients the *voluntary movements* are generally defective, whereas, all kinds of involuntary movements are exaggerated or readily excited. Spasmodic movements, or rigidity of the different muscles, are very common, so also are the spasms of the internal organs. There may be hemiplegia or paraplegia, or general paralysis with loss of motion, but the sensation is not impaired. As a rule, the paralysis is incomplete, the tongue and face are rarely involved; occasionally there may be ptosis. Even though the paralysis may last for a long time, the limbs do not waste, and the electric irritability is unaffected. In hysterical hemiplegia the patient walks without any swing-

Pathogno-  
monic sym-  
ptoms of the  
hysterical  
state.

Emotions.

Cutaneous  
sensibility.  
Special  
senses.

Movements.



ing movements, she merely drags her legs, and the toes are raised. In hysterical paraplegia the left leg is more affected, and if left unsupported while walking she manages to recover herself from falling to the ground. The bladder and rectum are unaffected. When asked to speak she can do so only in a whisper, or not at all (aphonia). This is not due to true paralysis of the larynx, for, under the influence of strong emotion, this loss of speech disappears at once.

Phantom  
tumour.

*Phantom tumour* among the hysterical is a curious enlargement of the abdomen, with a constriction below the margin of the ribs and above the pubes. It is quite painless, smooth, uniform, and moveable from side to side. The hysteric also suffers from disordered stomach and bowels, from palpitation of the heart, epigastric pulsations, and coldness of the extremities, from derangement of functions of the organs in the chest, such as oppression across the chest, hurried breathing, barking, spasmodic cough, hiccough, and even spitting of blood. There is also irritability of the bladder, with frequent micturition. Occasionally curious nervous phenomena—motor, sensory, emotional, or intellectual—are observed. Thus, *cataplexy*, *trance*, and *ecstasy* are most common. These nervous phenomena originate in mental excitements, such as those connected with religious fervour.

Cataplexy.

*Cataplexy* is marked by unconsciousness and fixed rigidity of all or of many of the voluntary muscles. The attack lasts for a few minutes, the patient remaining during the attack in the same position in which she happened to be at the commencement. On recovery there is no recollection of what has occurred. She is attacked suddenly after some mental emotion, and becomes pale and corpse-like, with respirations slow and pulse soft. She cannot be roused.

Trance.

*Trance*—In it the patient lies as if dead, the respiration and circulation having almost ceased. The patient sees visions, and begins to sing and dance.

*Ecstasy* is a condition analogous to catalepsy ; in this the person is put out of the natural state ; is insensible to all external impressions ; is absorbed in thought and has her eyes fixed. Propensity to imitation is common, and the delusions present great variety. In many cases the patient will remain apparently insensible to external objects, but they are not wholly insensible ; their pupils contract, and eyelids close under the influence of strong light. The respirations become re-established under powerful cold douche.

Ecstasy.

*Diagnosis.*—*Hysterical hemiplegia* may be mistaken for hemiplegia due to cerebral disease. In hysteria, hemiplegia affects with preference the left side of the body. When it occurs it does so after hysteric fits or creeps on gradually. There is no distortion of the face ; no deviation of the tongue from the median line. Paralysis is seldom complete ; it involves the arm and leg. The affected muscles are rigid, arms bent, hands firmly closed, and legs extended, toes pointed, and limbs and pelvis move in a mass. There is also partial loss of cutaneous sensibility ; the leg may be flexed and contracted, the arm at the same time may be flexed or the reverse. In hemiplegia from *brain disease* there is rarely hemi-anæsthesia, there is never persistent rigidity from the first, and the arm is first rigid then the leg follows. Again, in hysteria, hemiplegia is more severe in the leg than in the arm, and is subject to variations under treatment or emotions. In hysteria there may be weak sight, impaired hearing, and partial or complete anæsthesia of the skin, but no rigidity of the muscles of special senses. The paralysed muscles contract well enough under interrupted current of electricity. Again, hysterical hemiplegia is accompanied by retention of urine, pain in the head, and numbness ; sometimes by sensations of pins and needles in the paralysed parts.

Diagnosis.  
Hysterical  
hemiplegia.

Hemiplegia  
from brain  
disease.

*Hysterical paraplegia*—It may simulate paraplegia due to

Hysterical  
paraplegia.

diseases of the cord and to myelitis. In hysteria the paraplegia is accompanied by severe headache, but there are neither tremors during rest nor spasms in walking as in myelitis. In hysteria the lower extremities are feeble, the knees give way, and the feet drag on the ground. The paralysis is seldom complete; the patient can move his legs well enough when in bed, and may even get out of it; can only walk with a tottering gait; there is anæsthesia of the skin of the lower limbs, and there is retention of urine. Hysterical aphonia is an apparent paralysis of the vocal cords, and of muscles of the larynx, and may be mistaken for aphonia, due to laryngitis and other diseases of the larynx. In hysteria the onset of aphonia is sudden, it sets in after violent emotion or after taking cold, and lasts only an hour or two. The laryngoscope shows total absence of any structural lesion, and the cords are rendered tense on the attempt to make a sound. It is seldom accompanied with cough, and the voice becomes suddenly extinct. Galvanism at once returns it to its normal state. Hysterical *paralysis of the portio dura* accompanies hysterical hemiplegia, and is always connected with anæsthesia of skin, and of special senses of the same side, and hence mistaken for facial palsy. In hysteria this condition is temporary. Hysterical paralysis may be mistaken for *lead palsy*, *rheumatic paralysis*, and for *general paralysis*. *Lead palsy* always affects certain sets of muscles, leaving others intact; the arms are more frequently paralysed than the legs, and the extensors more than the flexors; the extensors of the wrist and fingers, and also the triceps and deltoid suffer. Electric excitability is much diminished or often entirely lost, owing to the atrophic condition of muscles in *lead palsy*.

Rheumatic  
paralysis.

*Rheumatic paralysis* occurs mostly in men, and is due to prolonged action of wet and cold, and has nothing to do with painful emotions. It affects in preference the

muscles of the lower limbs, and also invades muscles of the shoulder and of the hand, It is accompanied by pain at first, followed by numbness, and is easily cured by the electric current.

*General paralysis* is always accompanied with impediment of speech, impaired intellect, and tremors in the muscles. The muscles in a short time become completely atrophied. General paralysis.

*Treatment.*—*During the fit* the patient should be left alone Treatment. in a dark but well-ventilated room, sympathising friends being strictly excluded. Ascertain the cause of the fit, and, if possible, remove it. Loosen the clothes about the neck; take care to prevent injury; apply cold affusions to the head and face; sinapisms to the præcordia and extremities; hot foot-baths with mustard; onions or ammonia to the nostrils; close firmly both nostrils or the mouth by the hand; also apply assafœtida to the teeth or give internally. In obstinate cases try electric coil, some use inhalation of chloroform in these cases. *Of the hysterical state.*—If hyperæsthesia be present give bromide of potassium; for anæsthesia use the induced current; for paralysis give strychnia and phosphorus; for vomiting, creasote or acetic acid, and attend to menses. As a treatment some recommend hysterical girls to marry, but cases are on record where married women are hysterical, in them hysteria is only developed after marriage, such hysterics are a great bore to their husbands, have a great tendency to miscarriage, their children are often still-born, are delicate, sickly, and even inherit hysteria. The chief treatment is to engage the patient in some moral and mental occupation; change of scene and associations, and of air is essential.

The term *spinal irritation* is applied to a peculiar variety of hysteria in which the patient attributes her symptoms to some mischief in the spine, and she lies constantly on her back, and if treated as a disease, and indulged, it Spinal irritation.



lasts throughout life, and hence is rarely cured in the well-to-do classes.

### TETANUS.

Tetanus.  
Definition.

*Tetanus* is a disease characterised by violent tonic spasms of the muscular system. It so closely resembles the effects produced by the poison of strychnia that it is often said to exist in three varieties differing only in cause—traumatic, idiopathic, and toxic. Its course is short, violent, and usually fatal. It is more frequent in hot climates than in cold, and in hospitals than in private houses.

Causes.

*Causes.*—Tetanus, in most cases, succeeds a wound, more often a ragged wound than a clean cut, and more often an injury of the extremities than an injury of the head or trunk. In many cases believed to be of idiopathic variety, some breach of surface is discoverable on more careful observation, but cases in which no injury at all is present undoubtedly occur, though they are very rare. The tetanus of new-born children is traumatic, as was first shown by Trousseau in a famous clinical lecture, in which he compared with great skill the severed cord with the stump of an amputated leg. Some writers have maintained that the presence of dirt in the wound increases the chances of tetanus, and there is no doubt of the fact that tetanus neonatorum, of which fatal cases used frequently to occur in London lying-in hospitals, has become almost extinct since the advance of hygiene. It is still common among the inhabitants of St. Kilda, the most remote of the Hebrides, where children are born in little cabins reeking with turf smoke, and with the odour of dried fish and of oil of sea birds. A sudden fall of temperature during the night has also been observed to be followed by cases of tetanus in a surgical ward.

Morbid  
anatomy.

*Morbid anatomy.*—The post mortems on cases of tetanus tell little or nothing. The vessels of the cord

sometimes appear to be full, and sometimes the cord may be softer than natural, but in other cases no abnormal appearance whatever can be made out. The evidence at present collected points to its being a functional, not a structural, disorder. Rupture of muscles may be found. Rigor mortis is less than usual.

*Symptoms.*—In cases of wounds the disease sets in between the fourth and fourteenth day after injury. In idiopathic tetanus the disease sets in a few hours after exposure to the cause. The first symptoms which attract attention are pain and stiffness of the muscles of the jaw and neck, and the patient often describes them to be due to exposure to cold, as mere sore throat and wry neck. He has difficulty in opening the mouth, in masticating, and there is also stiffness of the head. Lock-jaw soon follows, and there is difficulty of swallowing. The stiffness now extends to the muscles of the trunk, and gradually to all the voluntary muscles, except those of the hands, eyeballs, and tongue. The spasm also extends to the muscles of the back. The body is curved backwards, and rests on the head and heels (opisthotonos), or is curved forwards (emprosthotonos), or curved laterally (pleurosthotonos). The disease spreads to the inspiratory muscles and to the diaphragm causing difficulty of respiration, and dyspnœa; to the muscles of the abdomen which become rigid and knotted; to the muscles of the extremities which remain either flexed or extended and stiff; to the facial muscles, which by their contractions give the face a painful look, known as risus sardonicus. There is great thirst and wakefulness, the bowels are constipated, the temperature may rise as high as 108° or 110°. The spasms are slight at first, occur at long intervals, but soon become more intense, more rapid, and more prolonged, and excited on the slightest disturbance. Thus the suffering is intense, the patient is much distressed. The countenance presents

Symptoms.

a peculiar aged expression combined with that of anguish. The breathing is very much affected owing to the spasm of the respiratory muscles. During the fit there is a feeling of considerable oppression and suffocation, and the voice is weak. Owing to repeated fits the skin becomes cold and clammy, pulse small and frequent, and there is sleeplessness. The pupils are dilated, the mind is clear to the last, but the bladder and rectum are unaffected.

*Terminations.*—Death may be sudden or gradual from suffocation (apnoea), or from exhaustion (asthenia), or from both causes combined, or may be sudden from spasm of the glottis or of the respiratory muscles.

In Bombay a peculiar form of tetanus known as trismus nascentium is very common. It is popularly known as nine day fits. Many cases occur in infants about the second or third week after birth. The infant in a few days loses flesh, and very rapidly. As the meconium is not properly discharged the child looks yellowish all over the body, does not take the breast nor feeding bottle, soon pines away, becomes convulsed, and dies. In such cases care should be taken to guard against cold or foul air, attend also to the meconium, give the child anise water sweetened with molasses or honey. Attention must also be paid to the remains of the umbilical cord.

*Prognosis.*—Is serious, the mortality is at the rate of 88 per cent. 50 per cent. of cases die within the first five days.

*Diagnosis.*—From strychnia poisoning. In strychnia fits come on within an hour; those of tetanus are slow in being formed. Strychnia is very quickly fatal, death is not so rapid in other forms of tetanus. The history of the case would point to strychnia in poisoning, and to injury in tetanus.

*Treatment.*—Generally remove the cause. If traumatic or due to injury to the nerve, divide it above the seat of

injury. Medicinally various drugs have been recommended, but of all the Calabar bean is said to be in best repute. This may be used hypodermically. Aconite, chloral, bromide of potassium, opium, cannabis indica, may be given internally; chloroform inhalation, ice bags to the spine, counter irritation to the spine, as cantharides liniment or chloroform, are worth trying.

### STRYCHNIA POISON.

Strychnia  
poison.

The alkaloid strychnia gives rise to violent nervous symptoms when administered in doses of a quarter of a grain and upwards. These symptoms occasionally come on during the use of strychnia in medicinal doses. They are more often exhibited when the poison is taken by accident or administered with suicidal or homicidal intent.

*Causes.*—Strychnia as prepared is a white crystalline substance of several forms, of which the commonest are the *long rectangular prism*, the *short hexagonal*, and the *regular octohedron*. It has an intensely bitter taste, which is perceptible even in a solution of the strength of  $\frac{1}{70000}$  of a grain. It is very insoluble in water but easily in chloroform. When heated it melts into a dark brown liquid, giving out at the same time abundant smoke, and an agreeable odour.

Causes.

*Tests.*—When to a granule of strychnia a little bi-chromate of potash, and a drop of strong sulphuric acid are added on a piece of porcelain, a rich blue colour is evolved, which soon becomes purple, then bright red, and finally brown. On sublimation, a peculiar hooked or claw-like sublimate is formed. The beans of *strychnos nux vomica*, *Kuchila* (sans), and pods of the *strychnos ignatia*, *tiente toxifera*, and *colubrina* are occasional sources of strychnia poisoning. The poisoning is sometimes seen in India, in those who take the drug as an aphrodisiac.

Tests.



**Symptoms.** *Symptoms.*—The first symptoms complained of are a feeling of suffocation and twitchings of the muscles, cramps come on, and soon after are followed by tetanic convulsions. These succeed one another very rapidly, and are even more violent than those of true tetanus; there is generally violent opisthotonos, for the rest the symptoms are those of tetanus intensified; the symptoms come on in from five minutes to one hour, and are usually terminated by death in six hours, though death has been known in so short a time as ten minutes.

**Treatment.** *Treatment.*—The treatment should begin with washing out of the stomach by means of the stomach pump. Tannin and charcoal are the only useful antidotes. It may be recollected that green tea contains a large proportion of tannin.

**Headache.**

### HEADACHE OR CEPHALALGIA.

**Definition.** Headache is a very prominent symptom in many acute and chronic brain diseases. It is often connected with rheumatism, neuralgias, or affections of the stomach, or syphilitic affection of the bones of the skull.

**Causes.** *Causes.*—Predisposing and exciting. Exciting:—Injuries to, or organic diseases of, the brain or its membranes. Diseases of the bones of the skull. Disturbance of the cerebral circulation, as congestion, venous obstruction, deficiency or deranged condition of blood to the brain. Predisposing:—Neuralgia of cranial nerves either within or outside the skull; all those circumstances which induce plethora or anæmia; diseases of the chest and abdomen; fevers and various acute inflammations; poison of malaria, of gout, or of rheumatism; all those causes which depress vital and nervous energies, as sedentary habits, undue bodily or mental work, various excesses, and abuse of drugs which act upon the nerve centres.

It must be remembered that from whatever cause, and in

whatever part of the head the disease may operate, it is always referred to the peripheral distribution of sensory nerves which are distributed to the base of the brain, and which are also distributed to the membranes and bones of the skull, and to the skin.

The chief clinical phenomena to be observed are :— Whether the headache is due to any obvious exciting cause ; whether it is constant or intermitting, localised or general, superficial or deep ; whether the pain is like a weight upon the top of the head or causes a sense of constriction ; whether the pain is heavy, dull, aching, throbbing, shooting, or boring ; or whether the head feels as if going to burst ; whether it is aggravated by movements, change of posture, muscular exertion, or taking food and whether it is accompanied by any tenderness, must also be noticed.

Clinical  
phenomena.

Headaches are found varying with the localities they invade. Thus, headache may be limited to—1, one half of the forehead and to the corresponding eye ; 2, the parts supplied by the first branch of the fifth ; 3, both sides of the head, or to back or vertex ; 4, the temples, or to the neighbourhood of both ears.

Seat of  
headache.

Headache often coexists with vertigo, increased sensibilities of the eyes and ears, with nausea and vomiting, or vomiting without nausea, with drowsiness or wakefulness, and with delirium. When due to any organic disease of the brain, or of its membranes, it is generally accompanied by vertigo, fits of vomiting, confusion of intellect, and noises in the ear. The pain is sharp, lancinating, or throbbing. In cases of abscess or tumours of the brain the attacks are paroxysmal, and then, as in inflammation of the brain, the headache is intense, and causes the patient to scream. It is often confined to one portion of the cranium ; is increased by noise, warmth, and movements, and is lessened by elevating the head. When headache is due to plethora there are

fulness in the head, noises in the ears, and giddiness on stooping.

It is worthy to be noted that very often simple pressure of an unyielding hat upon the frontal branches of the fifth nerve causes pain in the head.

*Causes.*

*Causes.*—Headache is more common among adults, it is favoured by hereditary predisposition; the dwellers in town suffer more than those of the country; females more than males; the nervous and more delicate, more than the robust; the middle and higher classes more than the lower. Hunger often leads to it.

*Symptoms.*

*Symptoms.*—Very often the symptoms are insidious, and the patient experiences on rising in the morning, depression of spirits, great uneasiness, coldness of hands and feet, chilliness, irritability of temper, yawning, disinclination for food and drink, with a slimy taste in the mouth. The vision becomes impaired and is soon followed by headache, which is very intense and throbbing, and is limited to one half of the forehead. If the carotids be pressed the headache diminishes; there is hyperæmia of the affected part of the head, with redness of the conjunctivæ, and excessive secretion of tears. When the paroxysm is intense the patient begs to be left alone, feels extremely low and depressed, and even cannot bear light and sound. The pulse is slow and soft, and the pupils are contracted. At this stage there is nausea and bilious vomiting; this aggravates the pain for a time. The pain is relieved when the patient falls to sleep. On awaking he feels refreshed, only slight tenderness being left behind.

*Duration.*

*Duration.*—The disease lasts for two or three days.

*Treatment.*

*Treatment* depends upon the cause; relieve congestion of the brain, remove dyspeptic symptoms and give tone to the system generally, the diet should be such as can easily be assimilated. Tea has an injurious effect with the dyspeptic. Some prescribe guarana powder from the

seeds of *Paullinia sorbilis*. With some snuff to the nostrils, or tobacco internally does good. The torpid liver as well as the bowels may be relieved by mild purgatives. If the gouty condition be present colchicum does good. Stimulants should be avoided in all cases except in nervous headache, where stimulants and tonics may be given. If headache (*tic douloureux*) depends upon a bad tooth, remove it; some recommend the division of the affected nerve (this has been tried in St. Bartholomew's, but without success). Local anodynes and anæsthetics do good sometimes, as also chloroform. In hemicrania give internally, arsenic, quinine, &c. For headache in hysteria, nervine tonics as *nux vomica*, and preparations of zinc may be tried with benefit. *Belladonna* has a great reputation as an internal anodyne.

Very often the patients firmly hold their head with their hands and in so doing they produce marked cerebral congestion and thus relieve headache; they also tie a tight band across their forehead and thus relieve it by compressing the temporal arteries. These means afford great relief at the time of intense suffering. I have often experienced relief obtained by application of hot *Dhan-chawl* (Hind) (*Oriza Sativum*) or *Joar* (Hind) (*Holcus soeghum*), poultices over the scalp. Very often evaporating lotions, or application across the forehead of a thin piece of cloth soaked in rose water or *Eau de Cologne* are tried with success. A few leeches to the temple rapidly give relief. Fomentations or poultices, or the reverse, ice-bags, relieve it with many. Oil of peppermint or hot ginger, or even electricity may be tried with advantage.

The natives in India apply plaster of lime to their temples with benefit, and often apply extract of opium to their forehead and nose.

Internally, iron with strychnine is a favourite remedy with them. They also recommend sea-bathing. When



all remedies fail, they cauterize the forehead with the iron at white heat and thus relief is obtained.

Vertigo.

### VERTIGO—GIDDINESS.

Definition.

The word literally means turning round. The patient notices that he has lost his balance and the surrounding objects appear to be in motion, he grasps at some firm support, often recovers without dropping, and then sits down at once. Where the patient suffers repeatedly from it, the affection is a warning of some disease of the brain, or of other mental disorders.

Varieties.

There are two forms of vertigo: in one the patient has a staggering gait. In the other, the extraneous objects seem to move in different directions. It may vary from the uncomfortable oscillations felt on landing after a long sea voyage, to a feeling of immense staggering, so that he either falls to the ground or supports himself by holding some fixed object. It may be constant or paroxysmal; may be felt on moving the head, may become worse when sitting or standing. Occasionally it ceases during sleep, or while he is lying down or when his eyes are shut.

Causes.

*Causes.*—Some general or local disorder in the circulation of the brain. This disorder frequently attends cerebral anæmia, syncope or loss of blood; or cerebral congestion; or inflammation. May depend on the organic diseases of the brain and its membranes, as effusions, tumours; may be due to functional nervous disorders as epilepsy, eclampsia; to movements which influence cerebral circulation; to poisonous or poor state of blood, as in fevers; to exposure to bad emanations, as of smoking, abuse of alcohol, opium &c.; to suppression of chronic discharges; to irritation of the special senses, as the eyes, the nose, or the ear; and frequently to derangements of the stomach.

Pathology.

*Pathology.*—Experiments have proved that injury to the cerebellum or to the crus cerebri, and other neighbouring

parts is attended with giddiness, that the affections of the eye, and of the ear, and of the spinal nerves also cause vertigo. With reference to the eye its affection is attended with squinting, in case of the ear there is deafness, which may be due to diseases of the semicircular canals, and is known as Menière's aural vertigo. The affections involving the spinal nerves, the inco-ordinate movements in locomotor ataxy, the oscillating movements in insular sclerosis, and tremulousness in paralysis agitans, are either attended with vertigo, or vertigo with defective sight or defective hearing. In many cases vertigo betokens general weakness, as in the early stage of convalescence from fevers and other acute diseases. It may be symptomatic of derangements of the stomach, liver, or intestines, or of kidney diseases attended with albuminuria, or of diseases of the heart. In females, prolonged lactation, so also menorrhagia causes it. In old people, very often a diseased condition of the coats of the cerebral vessels leads to it. When due to deranged stomach it occurs in two forms. The acute variety comes on suddenly, and there is loss of consciousness. The chronic occurs frequently, is worse after fasting, and is relieved by moderate meals or stimulants, as also by shutting the eyes during the attack.

*Treatment.*—As there is depression of vital powers even though it may be due to cerebral congestion, tonics and stimulants are very useful. Where the head is very hot, and there is throbbing of the temples with noises in the ears, purgatives with plain diet do some service. Chronic cases often require blisters behind the ears or setons to the nape of the neck. For the attack in the aged, corrosive sublimate has been highly recommended. Treatment.

#### MENIÈRE'S DISEASE. AURAL VERTIGO.

*Menière's disease* is an affection which manifests itself by sudden attacks of vertigo, and is associated with Menière's  
disease.  
Definition.

morbid conditions of the semi-circular canals of the ear.

It has been experimentally observed that injury to the horizontal canal leads to rotation of the head from side to side ; that to the superior canal causes the head to move upwards and downwards and to fall forwards ; in injury to posterior canal the head falls backwards, and also moves upwards and downwards. The semicircular canals are concerned in perfect hearing and in keeping the equilibrium of the head ; any injury or disease of these organs gives rise to impairment or loss of hearing, and to vertigo or swimming in the head. In otitis externa and in diseases of the middle ear due to exposure to cold, the inflammation leads to exudations which, pressing on the contents of the labyrinth, extend their force on the semi-circular canals, and thus deafness results. But in a vast majority of cases without any otitis or any similar cause, the patient is suddenly seized with noises in one ear or in both ears, and there is vertigo followed by faintness or pallor of the face, with perspiration, nausea, and even vomiting. Such symptoms last for a few seconds, and the patient feels apparently well. At first the attacks recur at long intervals, but sooner or later the intervals become shorter and the exacerbations longer, till the patient is seldom free from the attacks. The noises in the ear or ears may vary from a mere buzzing, or humming, to a sudden explosion. Giddiness may be slight and transient or may be prolonged, as that which attends sea sickness ; it may be such that the patient is thrown suddenly forwards or backwards or laterally, and he is obliged to hold for support any neighbouring object or else he falls to the ground. Very often giddiness is followed by momentary faintness, palpitation of the heart, and signs of syncope. When the patient recovers the recovery is followed by vomiting. There is no headache, the consciousness is retained throughout, no convulsions, no paralysis nor any

phenomena indicating brain mischief. In many cases noises in the ear or ears are associated with gradual deafness. When the deafness becomes absolute the disease declines and giddiness disappears.

*Treatment.*—It must be directed to the cause. The fits should be relieved by lying down or by avoiding noises and other such influences. Treatment.

### INSENSIBILITY. STUPOR. COMA.

Insensibility.  
Stupor.  
Coma.

These signify loss of consciousness. Complete coma being attended with suspension of all the cerebral functions.

*Causes.*—May be due to injury to the skull; to alteration in the cerebral circulation; or to effusion upon the brain; to some poison in the blood from without, or generated within; to functional or organic diseases of the brain. Malingerers often feign insensibility. Causes.

*Varieties.*—Coma may be found in a variety of diseases, and it varies with each individual case. Thus, in— Varieties.

*Coma.*—*Of apoplexy.*—There is complete loss of consciousness, loss of sensation and voluntary motion; there is stertorous breathing and a peculiar countenance. *Of drunkenness.*—History of alcohol, the patient can be roused, the insensibility is not complete, there is no hemiplegia, and there is smell of alcohol. The respirations are slow, and the urine is frequent and limpid. *Of uræmia.*—No hemiplegia. The urine if any is scanty and albuminous, and is deficient in urea. There is smell of urine about the patient. Dropsy in other parts. The coma is profound, with remarkable intermissions, and there are muscular twitchings. The face is pale, the surface moist, the pupils are dilated, and the temperature is high. *Of narcotics.*—The pupils are contracted, the skin is cold and moist, the respiration is natural, the pulse is soft, there is smell of narcotics in the breath and in vomited matters, and the patient can be roused; there is no hemiplegia, the patient merging into deep coma. Coma.  
Apoplexy.  
  
Drunkenness.  
  
Uræmia.  
  
Narcotics.



Concussion of  
the brain.

*Of concussion of the brain.*—The patient recovers only to a certain degree, although vomiting continues ; the skin is cold, the breathing easy, the pulse is small, and the features are not altered. There is snoring with difficult breathing, and the pupils are dilated.

Compression.

*Of compression.*—There are external marks of injury, or there is paralysis. The pupils are unequal, and there is bleeding from the nose.

Epilepsy.

*Of epilepsy.*—The attack will not be long ; there is an account of former seizure, the muscles are rigid, the pulse is rapid, there is no paralysis, and there is a tendency for the attack to recur.

Treatment.

*Treatment.*—During the attack the patient should be kept in a recumbent posture, with the head slightly raised, all tight clothes about the neck should be loosened and fresh air allowed. When due to narcotic poison, as opium, use the stomach pump ; if due to blood poison, as uræmia, diabetes, jaundice, low fevers, use diuretics and diaphoretics ; when due to organic diseases of the brain, rouse the patient by shaking and calling him loudly, by cold affusions, by dashing cold water over the face, by sinapisms to the neck, chest, and calves. Artificial respiration, and various local and internal stimulants are also useful. If the limbs are cold apply hot bottles. The bladder and bowels should be freely emptied in these cases.

### MEGRIM. HEMICRANIA.

Megrim.  
Definition.

*Megrim*, otherwise known as sick headache, is a paroxysmal affection, and is limited to certain parts of the head. It is essentially a periodic disease, and comes on more or less regularly at certain periods. Ill health favours its production. It is frequently attended with vomiting and disturbed vision.

Causes.

*Causes.*—Commences at puberty. It is more common in

women than in men, and in women when exhausted by over-lactation or by menorrhagia. It often wears off with the decline of life. The disease is often hereditary; may occur at any age between two and thirty years, seldom after fifty; It is often excited by derangements of the stomach, as over-feeding or prolonged abstinence, by over mental or bodily work, by excesses of any kind, by insufficient or long hours of sleep, and by want of sanitary and hygienic laws. Very often various morbid impressions upon the eyes or ears or nose, as glaring lights, discordant noises, or offensive smells, or very often malaria, and even undue exposure to the sun leads to it.

*Pathology* is purely hypothetical. Some refer the headache to affections of the vaso-motor nerves, that their influence on cerebral vessels causes them to contract, and leads to disorder of the circulation of the blood into the nervous centres, which thus become anæmic. That to this disorder the defects of vision and other early phenomena of megrim are due, and they refer the headache, which is generally attended with dilatation and throbbing of the temporal arteries, to a secondary hyperæmia. Other observers admit the phenomena of disease as referable to anæmia and subsequent hyperæmia of the brain, but contend that there must be some antecedent cause to lead to affections of the vaso-motor nerves. This antecedent cause they call irregular accumulation and discharge of nerve-force. The disease is chiefly seated in the optic thalamus and in those parts of the brain which lie between it and the roots of the vagi. At one time the disease was regarded as an affection of the liver or the stomach, but attacks of megrim frequently arise without any digestive disorder, showing that it is not due to any of these disorders.

*Symptoms*.—The patient is suddenly seized with a dull, localised pain immediately over the eye or in the temple. In a short time its severity increases, and it is attended with

sudden shooting pain as if the head would burst, and is also greatly increased by movement or by mental exertion. The skin over the eye and of the scalp are both tender and painful when touched. The pain is generally confined only to one side, and when it affects both sides, one side is more painful than the other. Occasionally it attacks the back of the head instead of the scalp. With the headache the patient becomes pale and chilly, and looks miserable, he is unable to do any bodily or mental work, he dreads the disease, and feels tremulous. The pulse is slow. The disease is at its height when vomiting sets in, and after sickness the patient falls asleep. On awaking he feels quite free from headache. The dimness of sight is a disorder which often precedes or is associated with headache. The vision may be obscure, and he cannot recognise the face of persons at whom he is looking, or he observes various coloured oscillating spectra before his eyes. Besides the sense of sight, other senses, as of hearing, taste, or smell, also become perverted. There may be also anæsthesia or disthesia of the skin of the head and neck and of the face of the affected side. In some cases motor paralysis is superadded. The disease is seldom free from neuralgic pains in the back, neck, shoulder, and arm. Generally at the close of the attack, but rarely from the commencement, drowsiness occurs, which often merges into partial coma.

The disease may come on suddenly while the patient is in the midst of social enjoyments, or when distressed by discordant noises or glaring visions, or by offensive smells, or while labouring under heavy mental work. Sometimes he is disturbed from sleep with pain, at others he gets it immediately after rising from his bed.

*Duration.*

*Duration.*—The disease lasts from two to twenty-four hours. It is subject to recurrences, and may thus continue for several days. The disease subsides with vomiting or with sleep, and with it the patient is refreshed. During

convalescence he either perspires profusely or passes large quantities of pale urine.

*Treatment.*—Vomiting affords relief in some cases. Treatment. As regards stimulants, tea is the best remedy, as it has a marked action on the nervous system. Very often relief is obtained by pressure applied to the tender or aching part. The application of cold also gives relief by constricting the vessels, and thus diminishing the blood supply. Galvanism to the head and neck has been used. Bromide of potassium and nitrate of silver, or tincture of cannabis, in repeated doses, act well; opium, aconite, and nitrate of amyl have been recommended; guarana has a very marked and speedy effect.

### SLEEP.

*Sleep* is essential to all animals. In the heart's action there is a period of repose; the same will be seen with the action of respiration. Hence for one third of the twenty-four hours the muscles of the chest and lungs are in a state of partial rest. Sleep.  
Definition.

*Cause.*—It is believed to be due to the increased blood pressure upon the brain. Others suppose that there is a withdrawal of blood from the cerebral vessels rather than an increased quantity. In a case where the skull and dura mater were destroyed by injury the brain was seen perfectly motionless while the patient was in a deep sleep, and it swelled with blood when the patient awoke. Cause.

*Insomnia or sleeplessness* is a prominent symptom in insanity. It may be senile, toxic, or psychical. *Senile* sleeplessness may be due to degeneration of the cerebral vessels. *Toxic* is seen in delirium tremens, in jaundice, dyspepsia, and after drinking strong tea or coffee. *Psychical* occurs in persons suffering from mental anxiety, from diseases of the heart and large vessels, and in women of nervous or excitable temperament. Insomnia.



Treatment.

*Treatment.*—In order to secure repose of mind and body, a proper amount of exercise should be taken, the food ought to be nutritious, but free from the agents which produce flatulence or acidity, and the last meal should be taken four or five hours before going to bed; reading excitable novels should be avoided; the patient should retire to bed at an early hour. If all these precautions fail to produce the desired effect, and sleep does not return, the patient may have a glass of strong ale, or a tumbler of port wine, or a glass of brandy and water, all of which tend to produce good results. In some cases a warm bath a few minutes before getting into bed, or a warm foot-bath, affords rest. If the bowels be constipated, or if the patient be dyspeptic, or if there be headache, these points should be attended to. Use such sedatives and other agents as neither affect the head nor confine the bowels. For nervous sensibility, hydrate of chloral, or bromide of potassium are recommended.

### DREAMS.

Dreams.  
Definition.

*Dreams* occur during imperfect sleep; are most common towards the morning when consciousness is gradually returning.

Disturbed and frightful dreams are sometimes precursors of tubercular meningitis, epilepsy, or apoplexy. Children are alarmed by dreams when suffering from teething, from loaded bladder, or from irritation of the bowels, and from worms.

### DELIRIUM.

Delirium.  
Definition.

*Delirium* may be active or passive: *active* when due to excitement of the cerebral functions; *passive* when due to the depression of mental faculties.

Causes.

*Causes.*—These are organic or functional brain diseases; reflex cerebral disturbance, as from the stomach, bowels, or uterus; blood-poisoning introduced from without or gene-

rated within, as alcohol, opium, belladonna, fever poisons ; acute inflammatory diseases ; nervous exhaustion ; and acute mania.

*Treatment.*—The cause should first be ascertained and removed. When due to organic and inflammatory brain mischief, shave the head, apply cold affusions, remove the blood by leeches, and procure sleep by opium combined with tartar emetic, or by hydrate of chloral, or by bromide of potassium. Where due to low vitality use stimulants freely ; keep the patient very quiet, and remove all external sources of irritation. Treatment.

### CHRONIC ALCOHOLISM.

*Chronic alcoholism* is an affection produced by the too free use of alcoholic drinks. The patient loses his appetite, suffers from nausea, vomiting and foetid breath, his face is dull and vacant, and his conjunctivæ watery and congested. He is low-spirited and cannot sleep. Chronic alcoholism  
Definition.

*Causes.*—The disease is markedly hereditary, and is more common in men than in women ; it is often encouraged by an injudicious prescription of stimulants. Violent cases may occur in the young, from slight drinking practices begun in youth and continued through life and may develop degenerations in the tissues when the patient is passed the middle age. The disease is most common among the ignorant and illiterate classes, but is unfortunately an affection from which persons with superior intellects are not free. Porson the Greek scholar, Robert Burns the poet, Mr. Pitt, and many others might be mentioned as examples of different degrees of chronic alcoholism. Causes.

*The post-mortem appearances due to chronic alcoholism are very numerous.*—In discussing whether the continued imbibition of alcohol is beneficial or the reverse, they afford a most important argument. No due post-mortem ap- Post-mortem  
appearances.

pearance can be mentioned which is traceable to abstinence from alcohol, while those which are found in persons accustomed to its use affect almost every tissue of the body. Perhaps the commonest is atheromatous disease of the arteries and veins. This may affect the aorta only, or the vessels of the brain, or may affect the entire vascular system. The kidneys may be atrophied and granular, the liver fibrous and shrunken, or positively cirrhotic, and there is thickening of the mucous membrane of the whole alimentary canal.

Symptoms.

*Symptoms.*—The patient may be temperate for weeks or months and then abandon himself to violent excesses for a day or two, or a week, or he may be an habitual drunkard, or the patient indulges so long as the opportunity exists.

Nervous phenomena.

The symptoms are characteristic and relate to nervous phenomena, to general appearance, to disordered alimentary canal, to organic visceral changes and to degenerations. Thus we find muscular tremors in limbs, slight at first and controlled by will; gradually they become constant, worse in the morning and diminished by food and drink. They are accompanied with sleeplessness, with horrible dreams, the mind is impaired, and there are horrible delusions as if people plot his ruin. He is a coward, and tells lies about drink. There is also impairment of muscular co-ordination.

General appearance.

The patient is either obese or emaciated, features flabby and bloated, eyes red and watery, conjunctivæ yellow from jaundice or fat, nose and cheeks red, and veins over them enlarged. There is loss of appetite, the tongue is thickly furred, the lips are cracked and dry, and often there are serious hæmorrhages from the stomach or bowels. In such cases alcohol is neither transformed nor destroyed in the living body, but the whole is excreted unchanged in the breath, sweat, or urine.

Alimentary canal.

Treatment.

*Treatment.*—The disease being a protracted state of general depression and restlessness, our aim must be to

reduce the quantity, or enforce total abstinence in the young, and after the first attack, and moderation in the old and feeble, and in the habitual drunkard. Guard against general depression by nourishing diet and occupation to the mind by out-door exercise and cheerful society. Seclusion in some place where alcohol cannot be obtained is necessary. Against restlessness exhibit, when useful, opium in any of its forms; very often extract of hyoscyamus or of cannabis may be substituted. Some recommend bromide of potassium, hypophosphate of soda, and ammonia and bark, in such cases.

## INSANITY.

Insanity.

The subject of insanity forms a separate branch of medicine, and usually receives less attention than it deserves in text-books of medicine. I have therefore thought it worth while to mention its chief varieties in this place.

However independent, in some of its functions, the mind may be of the body, it is certain that particular conditions are essential for the proper action of the mental faculties. They may occasionally overcome these physical necessities, but if so, with an extraordinary loss of tissue. The lines of Dryden exactly express the nature of the process, when the powers of the mind and of the body do not work together :

“ A fiery soul that, working out its way,  
Fretted the pigmy body to decay,  
And o’er-informed the tenement of clay.”

A sufficient flow of oxygenated blood, a proper nutriment and normal temperature, sufficient light, sufficient sleep, these are essential for the preservation of the mind in its normal condition. None of these can be long withdrawn without danger to it.

*Definition.*—Insanity or unsoundness of mind may be *Definition.*



defined to be a state in which there is a want of balance of the powers of the mind. Some may be present in excess or some may be absent altogether. A human being may be almost mindless or may have his mind active beyond reason, in a particular direction. To draw the exact line between insanity and mere exaltation is very difficult.

“Great wits are sure to madness near allied,  
And thin partitions do their bounds divide.”

The English law recognises the difficulty and is exceedingly vague in its definition of insanity, leaving the point to be determined in each particular case.

There are three chief varieties of insanity. These are amentia, dementia and mania.

Amentia.

*Amentia*, or absence of mind, is the form of insanity which is congenital in *idiots*. Another variety, but not congenital is found in *imbeciles*, and *cretins* are another peculiar species.

Idiocy.

### IDIOCY.

Definition.

*Idiocy* exists in every degree from mere defect of some one faculty, to almost complete absence of all. Thus there are idiots whose only faculty is a notion of time. This may be remarkably accurate. One such idiot having, on his admission in an asylum, had his nails and hair cut at 10.45 a.m., came every day at precisely that hour, holding out his hands and bending his head for the repetition of the operation. He was, of course, unable to read the clock. As an example of idiocy in which a particular faculty only was defective, may be mentioned. One who was able to do long multiplication sums in his head, but who when asked how many apples at a pie each could be got for an anna (equal to twelve pice), said one apple for one pie, four pice make one anna; how many apples is that for one anna? and after repeating this many times he was unable to get any further, and finally shook his head,

saying, "I can do sums, but never was good at puzzles." The elaborate education of idiots has brought out more and more this broad fact, that it is only a little piece of mind, so to speak, which is absent in many cases.

*Cause.*—Consanguineous marriages of families which are tainted by insanity, or have deaf and dumb members, or are scrofulous, is the chief cause of idiocy. Too early closure of the cranial bones appears in some cases to prevent the proper development of the brain, and the same result is produced, though not in every case, by congenital hydrocephalus. Cause.

*Symptoms.*—A vacant expression, a loud laugh, a shambling gait, dribbling from the mouth, an ill-shaped head, and dirty habits are the symptoms of idiocy. Symptoms.

*Diagnosis.*—The most important point is the determination of whether the child will be an idiot or not. A good general rule is, that if a child of the age of five years can hear and cannot talk, though its vocal organs are complete, it is an idiot. Diagnosis.

*Treatment.*—The treatment of idiots consists in their careful education, which can only be carried out in an institution for the purpose. Treatment.

### IMBECILITY.

Imbecility.

Cases of imbecility are among the most difficult of all to define. The defect of faculty is sometimes moral and sometimes intellectual, and is noticed not at birth but as the patient grows up or when he is grown up. Once established the condition closely resembles idiocy.

*Diagnosis.*—Great perverseness, inability to harm any thing, peculiar eccentricities, are the points which lead to diagnosis. Diagnosis.

*Treatment.*—These cases require careful management, and continued but gentle control. It is often a difficulty to find sufficient grounds for a certificate of insanity. Treatment.

## CRETINISM.

Cretinism.  
Definition.

*Cretinism* is a form of hereditary and congenital insanity met with in some mountain valleys, especially in those of Switzerland. Its chief peculiarity is that it is associated with goitre, that is to say, in such districts some members of a family have goitres and others are cretins. The thyroid bodies of the cretins are usually of the normal size. In other respects cretinism does not differ from idiocy.

## DEMENTIA.

Dementia.  
Definition.

*Dementia* is another variety of insanity, and may be defined to be madness without incoherence, while mania is madness with incoherence. The delirium of typhus fever may be compared to dementia ; that of typhoid to mania.

## INSANITY.

Insanity.

A great variety of phenomena, as delusions of every description, exalted and depressing, are observed, or the patient may have a tendency to some particular line of crime, to homicide, or to suicide.

Symptoms.

*Symptoms.*—The symptoms of insanity begin variously. Sometimes their onset is gradual. Sometimes the patient appears to become insane in a single attack of acute mania. Sometimes the attack follows parturition. Sometimes it is associated with the onset of a chronic disease, such as phthisis. To describe all the symptoms would be to write a complete treatise on insanity.

Treatment.

*Treatment.*—The treatment of insanity can, of course, only be pursued in proper asylums. The sooner insanity is treated the better for the patient. The advice of a person with special experience should be sought, and an impending attack may sometimes be warded off by change

of scene and rest from work, with strict attention to hygienic laws and careful observation. In many cases the patient need not be placed in an asylum. Other cases, particularly those of a suicidal or a homicidal nature, ought at once to be placed in an asylum. Friends often say that the patient will be driven quite mad by being placed in an asylum; this is a mistake. Patients, as a rule, who are mad enough to require to be placed in an asylum, probably hate restraint as much when it is exercised at home as in an institution. Melancholic patients do not become any less melancholic for staying at home.

In India the law of lunacy if slightly modified would meet every requirement, and will correspond to the English laws. For guidance it may be stated that in England the law of lunacy is divided into two parts—one relates to the person and the other to the property of a lunatic. The laws do not affect all lunatics. A man may be a lunatic for years, and may be attended in his own house or in that of his relatives or friends, provided that his relatives or friends take care of him; but if the lunatic is not taken care of by his friends or relatives, or if they neglect him and he is found wandering at large, then the laws apply to him, and the Home Secretary or the Lord Chancellor may order him to be properly visited in a lunatic asylum.

The laws accurately define the persons who may take care of lunatics without legal supervision. They must be persons “who derive no benefit from the charge;” but the committee may take charge of such a person found lunatic by inquisition, or may order him to the lunatic asylum without medical certificates, upon his own order, having annexed to it his own office appointment. For a private lunatic patient he is only to be kept by his friends or relatives or sent to the asylum after the due execution of three legal documents called ‘The Order and Medical Certificates.’ The *order* runs thus :

Law of  
Lunacy.

Defined.



The order.

“I, the undersigned, hereby request you to receive \_\_\_\_\_, whom I last saw at Dhobee Talao-Gergaum Road, Bombay, on the 10th day of October, 1878, a person of unsound mind, as a patient, into your house.”

It must be remembered that the person signing the order must have seen the patient within a calendar month; he must also state where he saw him last, and affirm that he is of unsound mind. The order must be signed by the nearest relative or friend, or a magistrate, or the minister of the parish. The order should not be signed by persons who may be peculiarly interested, by the medical attendant of the asylum into whose charge the patient has to go, or by the proprietor of the house in which he is to be kept, or by the father, son, brother, or parties of medical men who sign the medical certificate, or by one who himself has signed one of the certificates.

The order must be directed to the proprietor of the house or to the superintendent of a lunatic asylum or of an hospital under whose care he is to be placed. The order authorises him to keep the patient for one calendar month from the date of the order; after a month a fresh order will be necessary. For the guidance of the proprietor or the superintendent the following particulars may be added to the bottom of the order:—Thus, the name of the patient must be stated in full, and other particulars in the printed form should also be given in full. There are two or three points upon which proper information is often not obtained from the patient's relatives or friends. Thus, the duration of the attack is often given as very short, although the patient may have been insane for a long time; again, the disease may be hereditary, a fact which friends would like to conceal; they would also not like to describe him as suicidal or dangerous. To avoid such inaccuracies there

is a clause in the Act 16 & 17 Vic. c. 96, s. 5, which provides for such fallacies.

The *medical certificates* should be two, and can be signed by any (qualified) physician, surgeon, or apothecary, if he be registered under the Medical Act passed in the session 20 & 21 Vic. c. 90. The two medical men must not be partners in the profession, nor one be the assistant of the other. Neither of them must be the proprietor or superintendent of the asylum into which the patient is to be received, nor must he be a medical attendant of the asylum or of the house after the patient is received in it, nor should he be one who receives any share in the money for the patient. No medical man who shall sign the order shall sign the certificate. Thus, the co-operation of four medical men, of whom three ought to be medical men, is requisite. The form of the medical certificate may be mentioned.

I, the undersigned, being a licentiate of the Royal College of Physicians London, and being in actual practice as a physician in Bombay, hereby certify that I, on the 9th day of October, 1878, at 93, Dhobee Talao-Gergaum Road, Bombay, separately from any other medical practitioner, personally examined

Medical  
certificate.

, of 93, Dhobee Talao-Gergaum Road, Bombay, clerk, and that the said is a person of unsound mind, and a proper person to be taken charge of and detained under care and treatment, and that I have formed this opinion upon the following grounds :

1. His appearance denotes great agitation and depression; he is under a delusion that he is disgraced by his relatives, and that he would not pay them homage after their death.

2. I am informed by his friends that he has

attempted to commit suicide by hanging himself with a handkerchief.

(Signed) A. B. C.,  
Gergaum Road, Bombay.

Dated this ninth day of October, one thousand eight hundred and seventy-eight.

The medical certificate is only valid for seven days from the date of the certificate. You are always required to mention in your certificate your reasons for coming to a conclusion that the person certified is of unsound mind.

Upon such order and medical certificates the proprietor of a house or the superintendent of an asylum may receive a person as a lunatic.

*Treatment of nervous diseases in general.*—The treatment in cases of paralysis and other nervous diseases consists in the use of those remedies known as nervine tonics ; those which have a direct influence on rousing the dormant nerve-centres, as strychnine ; and those which have no special relation to the nervous system. Many cases occur from some affection of the skull or of the vertebræ, from syphilitic deposit, and it is, therefore, advisable in doubtful cases to treat them by iodide of potassium or perchloride of mercury. The remedies which act directly on the nervous system are numerous ; and of these *opium*, which acts by an indirect influence on nutritive processes, is useful in convulsions of all kinds. *Belladonna* has a direct action on the nerves, and through them controls various motor disorders. *Conium* acts on motor nerves and relieves paralysis, and on the cord and preserves its reflex action. *Aconite* acts powerfully on the nervous system, and influences nutritive processes in its various parts. *Chloroform* produces temporary quiescence of the nervous system, but has no permanent effect in arresting the morbid conditions. *Chloral hydrate* produces sleep, but like chloroform has no effect on morbid

lesions. *Cannabis indica* is only useful in megrim, *physo-stigma* in tetanus, *gelseminum* in neuralgia.

We know that in nervous disorders the affection is of long duration, and hence these temporary remedies are of little avail. Those that have a slower, but permanent effect, are necessary. Among the latter may be mentioned remedies which act indirectly upon the blood-vessels of the brain or cord. These are *iron*, *zinc*, *silver*, and *arsenic*. Thus, iron and arsenic are highly useful in neuralgia. Quinine and tincture of *actea racemosa* have cured many nervous disorders. Morphia, which in the usual way produces sickness, parched mouth, and other unpleasant symptoms when hypodermically injected, speedily soothes the system and relieves the local pain. For local nervous affections there are local remedies used in the form of liniments and ointments. They are less efficacious than counter-irritants, hot applications, or stimulating lotions. Plasters are often used with benefit in these cases; they act chiefly by keeping the part well supported and at rest, and also by the influence of the drug. In many cases of painful nerve affections cold douche is a very good substitute for hot fomentations. I have seen a Parsee Wadia family always cured by such treatment.

*Electricity*.—A hundred years ago Galvani discovered that electric currents were continuously passing through the animal body, and they are continually developed both in muscles and nerves. Subsequently the discovery of electro-magnetism gave a new impetus to the use of electricity in medicine, and the currents were induced by the magnet. This is known as *induced current* or intermittent galvanism, and is also styled Faradization, that from the battery being called *constant galvanic current*. Experiments on electricity have shown that if dry metallic points were applied to the surface the skin was merely affected, but if wet sponges were firmly pressed on a muscle, and if

Electricity.



the poles were also applied, the muscle was excited to contract.

Induced  
current.

*Induced current* is useful in cases where a set of muscles are inactive from long disuse. Thus, in hysterical and facial paralysis, and in some cases of progressive muscular atrophy, it is highly useful; it is inefficacious in cases where muscles without any apparent cause become wasted and useless. Thus in infantile paralysis it is quite useless; in hemiplegia it is partially useful.

Constant  
current.

The *constant current* is a much more useful agent, and its application produces a soothing influence on the nervous system. Its value has been greatest where Faradization had previously failed. It is very useful in cases of lead palsy. In progressive muscular atrophy the application of the constant current to the spine, and not in the course of muscles and nerves, is highly recommended where Faradization has failed. This current is useful in cases where the nerve is at fault, *e.g.* facial paralysis. In many cases both currents should be used, the intermittent at first and then the constant.

### DISEASES OF THE EYES.

Eyes.

Although the diseases of the eyes are elaborately described as a department of surgery, cases of acute disorders of the eye are so often seen by physicians that in the first instance I have thought it fit to give a brief account of them here.

Conjuncti-  
vitis.

*Conjunctivitis* is an inflammation of the membrane which lines the eyelids, and covers the anterior surface of the eyeball.

Ophthalmia.

Catarrh.

Symptoms.

OPHTHALMIA is an inflammation of the mucous membrane of the eye. *Catarrhal ophthalmia* is a mild form of inflammation due to exposure to cold, wet, and sudden changes of temperature. Its *symptoms* are slight pain and scalding, bloodshot appearance of the eye. At first the

eyes are dry, and a pricking sensation as of sand is complained of, owing to the sensitive eyelids rubbing over the enlarged vessels of the sclerotic conjunctiva. The vessels are enlarged and irregularly arranged. In a day or two the secretion becomes increased in quantity, and even puriform; the lids now glue together, and especially at night.

The *treatment* is to attend to the state of general health, to bathe the eyes with warm water, and to wear a shade. If the patient be plethoric, restricted diet and purgatives answer well. If the secretion is profuse and the lids adhere to one another, besmear the lids with simple cold cream at night. In recent cases a few leeches to the temple will do good. Treatment.

PURULENT OPHTHALMIA exhibits several varieties. The chief are purulent ophthalmia of adults, contagious or Egyptian ophthalmia, and purulent ophthalmia of infants. Purulent ophthalmia.

*Symptoms.*—Is a more destructive and more severe form of inflammation. The inflammation runs a very rapid course, is attended with violent pain, and leads to the formation of large quantities of thick and yellow purulent matter. The eyelids swell and are chimosed, the lids adhere closely, and pus adheres to the eyelashes in thick drops. Severe pain in eye and forehead. Occasional fever. Symptoms.

In severe cases the inflammation extends to the cornea and other internal structures, leading to ulceration, and causing blindness. The disease is contagious, frequently epidemic, and most common in India.

PURULENT OPHTHALMIA IN INFANTS OR OPHTHALMIA NEONATORUM.—It is produced by leucorrhœa or gonorrhœa of the mother. It generally commences about the third day after birth, and may follow exposure to cold or damp air. *Symptoms* begin with redness of the palpebral conjunctivæ: the edges of the lids adhere, and on separating a drop of thick pus escapes. As the case advances, Ophthalmia neonatorum.  
Symptoms.

inflammation extends to the conjunctiva, covering the eyeball, the discharge becomes more profuse, the lids more swollen, and the child becomes fretful, and very feeble. If not relieved, the cornea becomes ulcerated. Both eyes generally suffer. *Treatment.*—In such cases supportive measures are necessary. As there is tendency to ulceration and sloughing, all active measures, as leeches and purgatives should be avoided. Animal food, tonics, and mild stimulants are necessary. Locally, in the early stage use injections of alum and nitrate of silver. For the ulceration of the cornea apply solid nitrate of silver. The pain may be relieved by poppy fomentations.

Scrofulous  
ophthalmia.

SCROFULOUS OPHTHALMIA. — A kind of ophthalmia occurs in children during the weaning period, and between it and nine or ten years. It is common with scrofulous children. *Symptoms.*—Slight redness of the conjunctivæ

Symptoms.

or of the sclerotic; occasional pustules or ulcers on the cornea; great intolerance of light and profuse lachrymation; irritability of the nasal and buccal mucous membranes; the lids are also swollen. *Treatment.*—For scrofula. Locally, fomentations, green shade, and drops of Vinum Opii.

Rheumatic  
ophthalmia

RHEUMATIC OPHTHALMIA OR SCLEROTITIS is a diffuse redness of the eyeball, with enlargement of the arteries converging to the cornea. In it there is great intolerance of light, and severe pain in the eye. *Treatment.*—In every case the treatment ought to be directed for rheumatism. Locally blisters behind the ear, or to the nape of the neck. For the relief of pain anodynes are necessary.

Treatment.

Keratitis.

KERATITIS is an inflammation of the cornea. In this affection we find a zone of vessels surrounding the cornea, and the cornea is hazy. *Cause.*—Depressed health and debility. *Symptoms.*—Great intolerance of light and a copious flow of tears on exposing the eye. It is common in children and even in adults. *Treatment.*—Good diet

Cause.

Symptoms.

Treatment.

and tonics are useful remedies. Repeated blisters behind the ears will be proper. Eyes should be well sheltered, and bowels should be well opened. The patient should be imprisoned in a dark room.

IRITIS is an inflammation of the iris, due to injury, Iritis.  
gout, rheumatism, scrofula or syphilis. *Symptoms.*—A Symptoms.  
vascular zone in the sclerotic round the cornea, fixed and  
irregularity of the pupils, and a peculiar hue of the iris.  
*Treatment.*—If the patient be plethoric leeches, and if weak, Treatment.  
blisters behind the ear. In both cases salines internally and  
complete rest to the eye are essential. The eyes should be  
repeatedly fomented with hot water. In order to keep  
the pupils dilated drop in a solution of atropine twice  
a day. Some recommend mild mercurial preparations  
in such cases, others give only iodide of potassium. The  
ordinary treatment for gout, rheumatism, scrofula or  
syphilis may be adapted.

### DISEASES OF THE EARS.

OTITIS (*inflammation of the ear*) is most common in Otitis.  
children and in those who are scrofulous. In scarlet fever,  
otitis often extends from the throat, and even may lead to  
deafness. *Varieties.*—External otitis and internal otitis. Varieties.

EXTERNAL OTITIS—*Causes.*—Exposure to cold, gouty External  
diathesis, injury, accumulation of wax or any foreign body otitis.  
into the ear. *Symptoms.*—Dull aching pain on opening Causes.  
the mouth, swelling of the glands on the affected side, Symptoms.  
redness and swelling of the canal of the ear. At first the  
secretion is dry, in a day or two it becomes copious; it is  
also attended with deafness. Often ends in a small  
abscess in the meatus, or may lead to pyæmia. *Treatment.* Treatment.  
—Remove the cause, locally use fomentations and poultices,  
and frequent bathing the ear with warm water. Many  
apply blisters behind the mastoid process in such cases.



Internal  
otitis.  
Causes.

INTERNAL OTITIS.—*Causes.*—Exposure to cold, the poison of scrofula, gout, rheumatism, or of scarlet fever.

Symptoms.

Is most common in children. *Symptoms.*—Pain in the ear at first on swallowing, gradually the pain becomes severe, and is attended with loud and pulsating noises in the ear, and there is more or less deafness. There is fever with derangement of the kidneys and bowels. Delirium or even convulsions are present. The inflammation extending to the bony canal causes pressure on the portio dura, and leads to facial palsy. *Termination.*—By resolution, by suppuration and discharging itself externally, or by perforation into the internal ear. *Treatment.*—Remove the cause, relieve the pain by anodynes. Locally, vapour of hot water, or pappy fomentations and poultices. For the abnormal aperture left by abscess induce cicatrization by a touch of nitrate of silver. If the aperture be very large use an artificial membrane.

Termination.

Treatment.

Otorrhœa.

Causes.

OTORRHŒA (*catarrh of the ear*) is a muco-purulent discharge from the ear. It is often foetid. *Causes.*—Inflammation of the ear, presence of polypus or any foreign body in the ear, or granulations on the surface of the membrane. It occurs in children during dentition, or on the subsidence of exanthemata, especially in scrofulous subjects. *Symptoms.*—

Symptoms.

If the discharge continues for a very long time, it leads to caries of the bones of the internal ear; may even extend to the mastoid portion of the temporal bone, and may affect the brain or its membranes. When the brain is involved in the disease, cerebral symptoms are followed by convulsions, coma and death. Very often coagulation in a vein within the cranium (cerebral thrombosis) is one of the dangers of otitis or otorrhœa. *Treatment.*—Remove the cause, locally syringe the ear with warm water and soap. Astringent injections often succeed.

Treatment.

## DISEASES OF THE RESPIRATORY SYSTEM.

*Diseases of the respiratory system* may be conveniently considered under the headings of the larynx, the bronchi, the lungs, and the pleuræ.

*Anatomical account.*—The *larynx* is an organ situated at the upper and front part of the neck limited by the hyoid bone above, and extends to the lower border of the cricoid cartilage below. The *trachea*, which is a further continuation downwards of the larynx, commences on a level with the upper end of the œsophagus and the fifth cervical vertebra, and terminates at the third dorsal vertebra, giving off two branches known as the bronchi. Thus, the trachea is partly situated in the neck and partly in the chest. In the chest it is placed between the œsophagus behind and the transverse arch of the aorta and the sternum in front. The transverse portion of the aorta crosses it just above its bifurcation. The thyroid body embraces its first four or five rings in front in the neck. The *bronchi* are situated in the posterior mediastinum, and commencing as they do at the third dorsal vertebra bifurcate into the right and left bronchus. The right runs nearly horizontally, and is on a level with the fourth dorsal vertebra behind and second costal cartilage in front. The left runs obliquely downwards, and is on a level with the fifth dorsal vertebra behind and second intercostal space in front. The transverse portion of the arch of the aorta passes above it, and is in contact with it, the ascending portion of the aorta goes behind it. *Lungs.*—The *apex* of each lung rises above the first rib into the root of the neck. Its *posterior border* lies in the groove between the vertebræ and the ribs, and extends from the root of the neck downwards as far as the eleventh rib. The *base* is downwards and placed upon the convex surface of the diaphragm. Its position varies

Anatomy.  
Larynx.

Trachea.

Bronchi.

Lungs.

with the respiratory efforts. During expiration the liver on the right side and stomach on the left become elevated with the diaphragm, and therefore the base of the *right* lung reaches to the level of the fifth rib and the sternum in front, the base of the *left* to the level of the sixth rib in the same direction. The *outer margin* of the base can be traced in a direct line from the sixth costal cartilage downwards and outwards to the head of the eleventh rib. The *anterior borders* are separated above by a triangular notch with the base upwards, they then continue parallel and in contact up to the fourth intercostal space, where they again separate, the right anterior edge passing vertically downwards. The left border runs downward and outwards forming a notch or a triangle with the apex corresponding to the fifth costal cartilage. In this notch the heart can be traced for its superficial area. Each lung is divided into two lobes, and the apex of the lower lobe on either side is situated behind and about three inches below the apex of the upper lobe.

Pleuræ.

The *pleuræ* are serous membranes and correspond accurately to the form of the lungs. During ordinary respiration a portion of the cavity of the pleura extends beyond the anterior border, and beyond the lower margin of the lungs. The pleuræ do not line the thorax in front quite down to the attachment of the diaphragm. Behind they go about half an inch below the last rib. The entire respiratory tract is lined with ciliated epithelium.

Diseases of  
the larynx.

### DISEASES OF THE LARYNX.

Internal  
examination.

The examination of the diseases of the larynx may be internal or external. The *internal* may be facilitated by the use of the laryngoscope. The laryngoscope is an instrument by the aid of which we can see the condition of the larynx, and apply local remedies to the diseased

condition of its parts. The apparatus consists of a steady bright burner or flame, provided with a reflector ; of a circular concave mirror which should be freely movable in all directions upon its support, and should be such as can easily be adapted to the front of the eye on a spectacle frame or fixed to the forehead by means of an elastic band. The mirror should also have a central hole of an oval form through which the examiner can look when the mirror is fixed upon the eye. A mirror, or a number of mirrors of different sizes, varying in diameter from half an inch to an inch, and fixed at an angle of  $120^{\circ}$  to a stem measuring from six to eight inches, may be used. The examination can be made by inspection and palpation.

The examination may be thus effected :—The patient should be seated in front of the examiner, his head inclined a little backwards ; the lamp should be placed on one side and a little behind the head. The examiner's eye should be at the distance of a foot from the patient's mouth. The mirror should now reflect light on the patient's uvula. The patient should be told to open the mouth wide and to protrude the tongue, which may then be grasped downwards and gently by the examiner. The laryngeal mirror, previously warmed over a lamp or by immersion in hot water, is now passed backwards till it reaches the base of the uvula and its surface facing downwards and forwards, with the horizontal plane of the mouth. Should the orifice of the larynx be not visible, the position of the mirror should be slightly changed, in this direction or that. In this examination great patience and perseverance are required. It is best to introduce the mirror several times in the course of a sitting, rather than to allow it to remain long during one introduction. Care is also necessary that the tongue be not unduly depressed nor drawn forwards and injured by the teeth. During introduction the mirror should not touch the tongue, nor should unnecessarily touch the palate.



Examination  
during  
health.

The examination *during health* may reveal only the epiglottis or all the boundaries of the orifice of the larynx, the aryteno-epiglottidean folds, the cartilages of Wrisberg, the posterior commissure, the rima glottidis, the true and false vocal cords, and sometimes the tracheal cartilages, and even the bifurcations of the trachea. The whole of the larynx is of the same colour as the mouth except the true vocal cords, which are pearly white, and the edge of the epiglottis with cricoid and tracheal cartilages are distinctly yellowish.

In order to notice the movement of the cords, and to examine the glottis when the rima is fully open and when it is perfectly closed, the patient should be directed for the former to draw a deep breath, and for the latter to utter a vocal sound, as “ah,” or “ha.”

During  
disease.

During disease the examination may reveal the presence of any swelling, congestion, or inflammation, or their results, as exudations, or ulcerations, or the presence of warty or any other morbid growths, or aneurysmal tumours, or paralysis, or spasm of the vocal cords.

External  
examination.

*External examination.*—By it we ascertain the presence of pain on pressure; the deviation of the trachea from its normal position by tumours or any other cause; or swelling with induration of the surrounding tissues; and stony hardness and fixation of the larynx from carcinoma or any other cause.

Cold in the  
head.

### NASAL CATARRH (COLD IN THE HEAD).

*Nasal catarrh* is a catarrhal inflammation of the membrane of the nasal cavities, sometimes extending to the frontal and even to the sphenoidal sinuses.

Causes.

*Causes.*—Draughts of cold air on the back of the neck, wet feet, or sudden changes of temperature are its causes.

Pathology.

*Pathology.*—It is said to be due to some specific animal poison which, circulating in the blood, manifests its presence in the nose and other respiratory organs by irritating them

by its presence, or by producing irritation of these organs during its elimination. When the patient is exposed to cold the function of the skin is impeded, the cutaneous excretion is thrown back into the blood, it induces thereby a condition of toxæmia. This state of blood poisoning is corrected by the elimination taking place through the respiratory mucous membranes. So long as the poison remains in the blood the fever also continues.

*Symptoms.*—Langour, lassitude, depression of spirits, a feeling of tightness across the forehead, followed by profuse discharge from the nose and eyes, hoarseness of voice, sore throat and fever. In some cases an eruption of herpes appears about the middle of the lower lip. In mild cases the symptoms begin to subside in a day or two; in formidable cases they pass into acute tonsillitis, bronchitis, or pneumonia. The febrile symptoms become more marked and are attended with irritating cough. If the trachea is also implicated in the catarrhal inflammation, we have dyspnœa, and the patient feels great uneasiness on coughing. Symptoms.

*Treatment.*—The complaint is slight and mild, an aperient and a mild diaphoretic and putting the feet in warm water bring about a cure. Some recommend hot vapour inhalation or iodine vapour inhalation, others apply extract of opium to the forehead and nose with success. To take no liquid of any kind for twenty-four or forty-eight hours is an effectual remedy. Treatment.

## OZÆNA.

*Ozæna* literally means a stench. There is an offensive muco-purulent, sometimes bloody discharge from the nose, and the Schneiderian membrane is swollen. Ozæna.

*Causes.*—Repeated attacks of nasal catarrh occurring in delicate persons, strumous or gouty diathesis, dis- Causes.

ordered digestion, or syphilis. In many cases a foreign body, a piece of necrosed bone, or a polypus leads to it.

## Symptoms.

*Symptoms.*—Vary with the cause. The patient after an undue exposure to cold complains of great uneasiness in the nose owing to the thickening of the mucous membrane, and thus preventing the passage of air ; of frontal headache ; general weakness ; and mental depression. With these a profuse muco-purulent discharge takes place or large solid flakes of fibrin come away. The smell from these decomposed crusts is very offensive and is a source of disgust to the patient himself. As the case progresses the patient becomes more despondent and miserable, loses flesh and strength, and if the septum of the nose or the spongy bones become implicated troublesome caries or necrosis follows.

## Treatment.

*Treatment.*—Local and constitutional. Local, as the fœtor results from the decomposition of retained crusts, the nostrils should be frequently washed out and the inspissated matters dislodged. If due to small mucous polypi the secretion should be moderated by such remedies as destroy them or act as astringents. The acid nitrate of mercury, trisnitrate of bismuth, or the red oxide of mercury with sugar, or even snuff may be used with advantage. Constitutionally, nourishing diet, improvement of digestive organs, and tonics may be needful. In strumous cases a preparation of iron, iodine, arsenic and cod-liver oil, and change of air are often beneficial. For syphilis give iodide of potassium.

## Epistaxis.

## EPISTAXIS. HÆMORRHAGE FROM THE NOSE.

## Causes.

*Causes.*—Direct injury, or blows on the nose ; morbid states of the blood ; whatever obstructs or increases the circulation of blood into the nose ; congestion of neighbouring parts ; suppression of habitual discharges ; polypus ; or any diseases of the bones.

When it occurs in children it is seldom troublesome unless it comes on during whooping-cough, measles, or puerperal or continued fever. When it occurs in adults and if there be threatening apoplexy, or in a patient suffering from heart disease, it indicates disease in the coats of the blood-vessels in different parts of the body, and may prove a forerunner of a serious hæmorrhage into some internal organs. Very often epistaxis sets in during the progress of renal, hepatic, or splenic disorders, and in scurvy and purpura. In such cases it is profuse, and sometimes leads to death. The bleeding generally occurs from one nostril, is generally transitory, but may be periodic, may flow in drops or in a complete stream, may escape externally or pass backward into the fauces. Males suffer more than females.

*Treatment.*—The patient must be made to sit upright in a cool room, and any constriction about the neck removed. Sometimes raising of one or both hands above the head checks the discharge. Sudden application of cold to the neck, or to the back and forehead, stops the flow. Some recommend compression of the nostril to favour the formation of a clot. In some cases injections into the nostril of saturated solutions of tannin, iron, matico, do good. Where all these measures fail, the posterior parts of the nose may be plugged, and the plug allowed to remain there for forty-eight hours. To prevent its recurrence, the condition of the patient must be improved by tonics; attend to the derangements of the liver, and give a nourishing diet and change of air.

### ACUTE LARYNGITIS.

#### (LARYNGEAL CATARRH.)

Acute  
laryngitis.

*Acute laryngitis* or non-membranous croup is an extension of a common cold to the larynx, leading to congestion



and slight inflammation of the mucous membrane. It is attended with hoarseness of voice, soreness in drawing breath, and a dry tickling cough. Acute inflammation is more severe—but rare. It is peculiar to adults.

**Causes.**

*Causes.*—*Predisposing*: ill-nourished condition of the system; cold moist atmosphere; cold winds; sudden changes of temperature; previous attacks if repeated; males suffering more than females, and children (especially from a croupous variety); poorer classes suffer more than the rich. *Exciting*: direct irritation of the larynx; inhalation of cold or hot air, steam or vapour; swallowing hot or corrosive liquids; violent exercise of the voice, as in public speakers, or in those who constantly strain in coughing or shouting; ulcers or growths into the larynx; direct draught of cold air to the neck; extension of inflammation from the nose or pharynx, or from the bronchi. It is associated with diphtheria, erysipelas, typhus fever, secondary syphilis and tuberculosis.

**Post-mortem appearances.**

*Post-mortem appearances.*—The mucous membrane is of a bright red colour. There is swelling, opacity, and softening, with here and there spots of epithelial erosions. The membrane is dry at first, but soon becomes moist, and secretes glairy mucus which subsequently becomes mucopurulent. In mild cases redness is diffused, and the vocal cords are injected and swollen, and studded with flakes of mucus and lymph. In severe cases there is œdema of the glottis, or of the aryteno-epiglottidean folds, or of the false vocal cords.

**Symptoms.**

*Symptoms.*—The affection is dangerous, as it often leads to swelling of the glottis, and death by suffocation. The inflammatory fever is always slight. In the early period there is slight elevation of temperature, flushed face, frequent pulse, furred tongue, great thirst, and loss of appetite. The special symptoms often begin with coryza. The patient complains of dryness, constriction, with burn-

ing, or tickling in the throat. These symptoms are increased by coughing or speaking. Deglutition is painful, the voice is hoarse or inaudible, and there is a paroxysmal hacking cough. At first the cough is dry, but after a time clear viscid mucus containing a few epithelial cells is expelled with difficulty. This is known as sputum crudum. When the expectoration becomes more abundant and muco-purulent the sputum is thicker, it contains more pus cells, and is then called sputum coctum. Dyspnoea does not occur in these cases. In children it is often attended with œdema of the glottis, and hence is more dangerous than in adults.

*Complications.*—Acute laryngitis is apt to be followed by bronchitis, or by pneumonia, or collapse of the lung. Complications.

*Duration.*—The disease generally lasts for three or four days, when the secretion becomes profuse, and the patient recovers. Duration.

*Diagnosis.*—Acute laryngitis is often confounded in children with spasmodic croup (laryngismus stridulus). It is often impossible to distinguish between these two diseases, and the shred of false membrane is the only positive sign that the disease is croupous and not catarrhal. Spasmodic croup rarely commences with coryza; laryngitis often. Diagnosis.

*Terminations.*—Complete recovery. It may pass on to a chronic form, or may end in death from suffocation in from twelve hours to the fifth day. Terminations.

*Treatment.*—General and local. The patient should be confined in a warm room, and the air within the apartment must be rendered moist by hot steam. The neck should have a flannel covering. Locally: use counter-irritants or poultices, or hot fomentations to the neck; if the child be strong a few leeches at the onset may do good. Locally and directly to the larynx hot steam alone or steam medicated with turpentine, or with Treatment.

antispasmodics, as belladonna, or even with liquor ammonia, may be employed. Inhalation or the spray of atomized fluids of nitrate of silver, iron, or tannin, or alum, or the application of a sponge dipped in any of these solutions constantly to the throat may be of service. In acute cases, nauseating doses of ipecacuanha have been advocated. Opium may be used to relieve pain and distress. If the secretion be dry use diaphoretics and expectorant medicines. In severe cases, where notwithstanding all our efforts, relief is not obtained and distress increases, tracheotomy must at once be performed. By this procedure the larynx is allowed perfect repose, while suffocation, and the danger of extension of the disease to the lungs, are prevented.

Chronic  
laryngitis.

### CHRONIC LARYNGITIS.

#### (CHRONIC LARYNGEAL CATARRH.)

Causes.

*Causes.*—*Chronic laryngitis* may be due to repeated attacks of acute laryngitis; to constant irritation of the larynx, whether by extrinsic materials or by intrinsic growths, such as tubercles, cancer, polypi or syphilitic gummata; to aphonia clericorum; to specific laryngeal ulcers, as syphilitic, or phthisical, or variolous ulcers, or to non-specific ulcers.

Post-mortem  
appearances.

*Post-mortem appearances.*—The mucous membrane is engorged, its vessels enlarged, the mucous tissue thickened and firm, and somewhat swollen. The surface is dry, or covered with abundant secretions, and ulcerations are common.

Symptoms.

*Symptoms.*—The same as in acute laryngitis, only differing from them in being less violent, and more often attended with œdema of the glottis, and of the false vocal cords. The patient complains of a constant tickling of the throat, and of irritation of the pharynx. The

voice may be hoarse or cracked or is completely absent. Sometimes there may be periodic spasmodic cough, causing much distress, and the patients hawk frequently in order to clear away viscid secretion. Dyspnœa is rare, and is present only where there is much thickening of the larynx, and therefore chiefly in the syphilitic form.

*Treatment.*—Prevent the inhalation of irritants. Avoid loud talking. Rest to the larynx is essential. The patient must wear sufficient warm clothing over the neck and chest. Attend to the state of the alimentary canal. If the disease be due to syphilis or to phthisis, treat it by iodide of potassium or by cod liver oil. Locally apply direct medicated inhalations of belladonna, or of hot steam by means of a spray, or use application of powdered drugs to the larynx, by a camel's hair pencil, or by blowing them into the larynx. The chief local applications are mineral astringents, sal volatile, also stimulating liquids and sedatives. Chloride of zinc ʒss to ʒj of water may be used with benefit. Treatment.

### TRUE CROUP.

True croup.

*Croup* is defined to be a laryngeal obstruction occurring with febrile symptoms in children. It may be membranous or not membranous; may be due to diphtheria or not so. The non-membranous form has been already sufficiently described under acute laryngitis.

Definition of croup.

*True croup.*—It is a contagious disorder characterised in its membranous form by the formation of white patches on the mucous surface of the larynx and of the trachea. It is attended with extreme and progressive debility and is often complicated with temporary paralysis. Is met with in a sporadic form, and is also epidemic. It affects children between three and six, and is generally fatal among them. No season or place is exempt from its outbreak. The contagion is carried by the breath and may lie dormant in

Of true croup.



fomites, and can also be given by inoculation. In it the membranous exudation spreads over the mucous membrane of the larynx and trachea, and occasionally extends to the bronchial tubes, and hence bronchitis and pneumonia result. It often ends fatally.

In a large number of cases croup supervenes upon pharyngeal diphtheria and the exudation spreads by continuity. Thus the croup may be secondary to diphtheria or may be primary, and may either remain limited or spread to the pharynx.

The vessels of the mucous membrane exude a material which may be stiff and form a layer of false membrane or may be loose and can be wiped off easily. When stiff it obstructs breathing and causes fatal spasm of the larynx and of the air tubes. The shreds of the false membrane partially detached may also lead to fatal spasm. It is a purely non-specific inflammation, confined to the surface, and is hence distinct from the diphtheritic inflammation.

**Causes.**

*Causes.—Predisposing.*—Cold, damp and changeable climate; low and moist localities predispose to it. After the long heavy rains, and during the winter it is more frequent. The disease may be infectious, as many members in the same family are attacked at the same time. It may be sporadic or epidemic. Habitual exposure of the neck and throat to cold, and insufficient clothing are the exciting causes.

**Pathology.**

*Pathology.*—It is a local inflammation leading to a pseudo-membranous secretion. It also gives rise to swelling and obstruction of the aryteno-epiglottidean folds. The secretion leads to irritation and to the spasm of the glottis, or to the paralysis of the vocal cords which fall together. It also leads to the obstruction or to the impediment of air to the lungs, and to consequent imperfect aëration of the blood.

**Post-mortem appearances.**

*Post-mortem appearances.*—The mucous membrane of the larynx, trachea, and the bronchial tubes is swollen,

congested, and livid, or red ; occasionally there are abrasions and even ulcers ; very often the surface may be covered with a layer of false membrane or with viscid muco-purulent matter. The false membrane is seldom found in the bronchi, and less so in the larynx. Under the microscope the membrane consists of coagulated albumen and fibrin.

*Symptoms.*—The disease sets in with symptoms of fever and nasal catarrh, and is accompanied with hoarseness of voice. The child is usually fretful, and constantly puts his fingers to rub the larynx as if to remove some irritation from that part ; there is also slight difficulty in swallowing. The fauces are red and swollen. Physical examination of the larynx reveals nothing abnormal. The cough is brassy and ringing, the inspiration is loud and crowing. Symptoms.

As the case advances, or after the lapse of a day or two, the symptoms become well developed, the fever increases in severity, and owing to the obstruction to the free passage of air, and to the proper aeration of blood, the skin gets dusky, the feet cold, and the pulse feeble. The child suddenly awakes from sleep as if suffocated, has great dyspnœa, and a peculiar dry husky cough. He is extremely alarmed and fidgetty, tries to sit up or to leave his bed, the face is pale or livid and somewhat turgid, the eyes suffused and bloodshot. The respiration is peculiar, the inspiration is prolonged, and is attended with a difficult and a peculiar crowing noise. These symptoms only subside for a time, and then recur in paroxysms throughout the whole night. Towards the morning there is slight remission, and the little patient slumbers for some hours. This improvement is only temporary, the disease progressing insidiously. In the morning, after the child is awake, the febrile phenomena increase, the dyspnœa becomes greater, the voice more hoarse, and the cough more intense. The child now seizes the throat, or thrusts his fingers into

his mouth as if to remove some obstruction. He now becomes extremely restless, and tosses about in bed. The face becomes more flushed and even livid, and with each paroxysm the head is thrown back to take in more air. All these symptoms generally continue in some degree during the day, but are worse at night. Throughout the attack the cough is generally dry, the voice is extremely hoarse and even ends in a whisper, and there is no vomiting.

Favorable cases.

In *favorable cases*, very often relief may be obtained by the cough becoming moister, and there is expectoration of muco-purulent matter, or by the false membrane, which was exuded on the surface of the larynx and trachea, and obstructed them, becoming detached and removed. The crowing inspiration also ceases.

Unfavorable cases.

In *unfavorable cases* the interval between the paroxysms grows shorter, the feeling of suffocation is more marked, the cough becomes more difficult, and suffocative; the voice is almost lost, and the respiration is croupy throughout; with these symptoms, cold clammy sweats, and coma and drowsiness set in. The patient starts in terror, and becomes convulsed. The pulse is extremely feeble, the breathing becomes more hurried and oppressed, the head is thrown back, the alæ nasi are dilated, and the face is extremely livid, and is indicative of great agony. The child dies from suffocation, or from exhaustion and coma combined.

Physical signs.

*Physical signs.*—On *inspection* very little is to be noticed in the early stage, or before the brassy ringing cough has set in. In advanced cases there is a considerable amount of obstruction to the entrance of air into the lungs, and the physical signs are those of extension of inflammation from the trachea to the bronchi and lungs. The *percussion* note is resonant. On *auscultation*.—That the inspiratory murmur is indistinct is usually all that can be observed, unless the physical signs of bronchitis or pneumonia be also present.

Duration.

*Duration.*—The disease lasts from two days to a week.

*Complications.*—These are cynanche maligna (gangrenous ulceration of the throat), occurring during scarlatina. In it the exudation covers the mouth, fauces, pharynx, as well as the air passages. The exudation is in the form of pellicles, and often appears as patches of sloughs or as aphthous ulcerations about the mouth and palate in feeble persons. When croup supervenes upon measles or smallpox the fever becomes of a typhoid character, and the convulsions are frequent. It is often associated with pneumonia or bronchitis. These complications are extremely dangerous.

Complications.

*Diagnosis.*—*From diphtheria.*—Diphtheria, though probably of the same pathological nature, exhibits certain clinical differences, and is also epidemic and contagious. The diphtheria is not sudden in its attack; the disease is not limited to the trachea, but beginning at the pharynx may spread, and even involve the whole of the respiratory tract, and the false membrane may also be found in other regions. It is a specific constitutional disease attended with throat complications. It is accompanied by albuminuria and with swelling of the submaxillary glands, and is often followed by paralysis. It is very asthenic. *From tubercular laryngitis.*—Tubercular laryngitis occurs in adults, and is rare in children. In it there is a fixed burning pain in the larynx, there is no exudation of false membrane, but the attack ends in suppuration or ulceration. In it there may be ringing cough, but there is less fever and it is also associated with catarrh of the nasal passages. *From spasm of the larynx.*—In the spasm there is no fever, no croupous cough, there are complete intermissions between the fits of suffocation, and general convulsions are often present.

Diagnosis.  
Diphtheria.Tubercular  
laryngitis.Spurious  
croup.

*Prognosis.*—Is favorable where the respiration is quiet during the intervals, where the cough is attended with muco-purulent expectorations, or with discharge of fragments of exudation membrane, where there is no prostra-

Prognosis.



tion nor attended with complications. It is unfavorable in cases of obstruction to the entrance of air into the lungs, of closure of the glottis leading to pulmonary congestion; and where the disease extends to the bronchi and lungs. In some cases relapses occur even after the active symptoms have subsided, and more especially in weakly and irritable children. In fatal cases the fever is intense from the first, the attacks of dyspnœa very severe; the cough dry, the pulse is very frequent, small, and irregular, the face is livid, eyes sunken, features contracted, and there are symptoms of great prostration.

Terminations.

*Terminations.* — Recovery. Relapses are common. Œdema of the glottis. Bronchitis or pneumonia. Death from chronic inflammation.

Treatment.

*Treatment.*—Where the attack is apprehended the patient should be confined to bed in a moist warm room, should be placed in a warm bath, and ipecacuanha should be given to promote the expectorations. If the inflammation has set in, it should be at once checked, or its force diminished. Bloodletting or leeches or antimony or mercury should be scrupulously avoided. The patient's strength requires support. He must be well clothed in flannel, should have repeated hot and moist fomentations, and even flannel wrapper round the neck. With this treatment cough, hoarse voice, dyspnœa, and restlessness diminish. Should the treatment not have the desired effect, an emetic of ipecacuanha, repeated every two or three hours, does good. During the remission small doses of Potas. Iodid. will act with benefit. Demulcents, soup, and mild wines may be frequently given. If the temperature of the body remains high, reduce it by immersing the patient in a lukewarm bath, which acts both as a cooling and a sedative. During prostration the strength should be supported by stimulants and ammonia. Ammonia also acts in preventing

formation of coagula in the heart. To soften and detach the exudation, a spray of warm water, or of hot pulverised lime water, may be directed into the throat. Tracheotomy can rarely be recommended, as there is a tendency after it for croup to extend to the bronchi, thus leading to bronchitis or pneumonia. Again, the operation is useless, as death takes place in many cases from fibrinous clots in the right side of the heart. The history of a case in my own practice illustrates what usually occurs when tracheotomy is performed. The patient, a Parsee child, aged sixteen months, was on the point of death from asphyxia. The operation at once relieved it. The child lived five days, but then sank from exhaustion.

### PHTHISICAL LARYNGITIS.

*Phthisical laryngitis* is intermediate between acute and chronic laryngitis, may occur as an incident of phthisis or of tuberculosis; the tubercles being nowhere else but in the larynx, but it is rare not to have tubercles at the same time in the lungs. Tubercles formed in the lymphatic tissue of the larynx go through the same stages as elsewhere, being at first grey and then opaque, and giving rise to ulcers. The disease creeps on insidiously, and is sometimes far advanced before lung disease manifests progress. Like chronic laryngitis its progress is slow but increasing. It is an incurable malady. When the disease is established, the patient suffers from aphonia, from dyspnoea, and from pain in the larynx. Very often morsels of food pass through the rima glottidis.

*Phthisical laryngitis.*  
Definition.

*Morbid appearances.*—There are persistent thickenings of the larynx, progressive ulcerations, with extensive destruction of the soft parts, and caries of the arytenoid and other cartilages. The soft parts are thick, often pale, and opaque. Ulcers may sometimes be recognised.

*Morbid appearances.*

Ulcers.

The ulcers are shallow, round or oval, saucer-like depressions of an ash colour, and have swollen edges. Their chief seat is the margins of the vocal cords in which they have a tendency to extend, and also to destroy them by caries or necrosis. The arytenoid, the cricoid, and the thyroid cartilages are thus destroyed by these ulcers. They are also found on the under surface of the epiglottis, and on the back of the larynx, and of the vocal cords.

Laryngeal  
perichon-  
dritis.

In some cases the disease gives rise to inflammation of the perichondrium (laryngeal perichondritis) as a very common form of phthisical laryngitis. The inflammation often results in diphtheritic exudation which takes place between the perichondrium and the cricoid cartilage, the cartilage being nearly displaced by dense fibrous tissue. Suppuration soon results, and the cartilages are necrosed, and are discharged in fragments along with pus, and expectorated. The disease rapidly spreads. In some cases the cartilages undergo more or less ossification.

Treatment.

*Treatment.*—Counter-irritants applied externally and demulcents, with opium taken internally, are all that can be done for this disorder.

Syphilitic  
laryngitis.

### SYPHILITIC LARYNGITIS.

History.

The commonest effect of syphilis on the larynx is to set up an obstinate chronic catarrh, only to be distinguished from non-specific chronic laryngitis by the greater degree of thickening and by the history. Like the skin, the larynx is subject to erythematous inflammation. At a later period of syphilis, the mucous tubercles, like the tubercles elsewhere, become developed at any part of the larynx. These extend in depth and thickness and lead to destruction of several of its parts. In far advanced cases gummata appear beneath the mucous membrane, which

also like the gummata elsewhere break down and give rise to ulcerations. On examination by the laryngoscope the soft parts are more or less thickened, and ulcers may be recognised, and there is tendency for caries or necrosis of the cartilages to take place. The epiglottis always suffers.

*Symptoms, objective.*—The breath is foetid, there is foetid purulent discharge mixed with portions of cartilage. The voice is almost always altered in this variety; it becomes hoarse or uncertain or even reduced to a peculiar whisper. Where the tissues above the vocal cords are thickened by syphilitic deposits, or the cords themselves are thickened and immovable, complete aphonia takes place. *Subjective.*—The patient complains of burning, smarting pain, and tenderness in the larynx, which are increased by movement. Deglutition is painful as regards liquids, there is suffocative cough attended with expectoration of pus, blood, and laryngeal tissue fragments; and there is urgent dyspnœa. Syphilitic laryngitis is often associated with condyloma and warts. Symptoms.

*Terminations.*—Very often death takes place from obstruction of the necrosed cartilage into the laryngeal orifice, or from perforation of the arteries, and profuse hæmorrhage. Occasionally from permanent contraction of the glottis as a sequel of separation of the sequestra. Terminations.

The syphilitic ulcers are limited and superficial, generally begin on the epiglottis and spread rapidly and present irregular ragged edges. They have a tendency to extend at one part and cicatrize at another, and cause contraction and narrowing of the larynx.

*Treatment.*—The diathesis must be attended to, and syphilis needs especial treatment. Locally tannin and glycerine, or nitrate of silver to the ulcers, may be applied. Iodide of potassium may be given internally. Treatment.



## Tumours.

## TUMOURS OR MORBID GROWTHS.

Sometimes besides the syphilitic growths already described, we find in the larynx malignant and non-malignant tumours. The malignant tumours are epithelial, encephaloid, or scirrhus cancers. The non-malignant are mucous polypi, cystic growths, papillomata and lymphomata.

## Symptoms.

*Symptoms.*—A feeling of a foreign body or a sense of obstruction or uneasiness in the larynx, with difficulty of swallowing and alteration in the voice. There is cough and suffocative dyspnoea. When the growth is above the glottis the respiration is quite free, and sometimes the cough is attended with expectoration of fragments of the growths. Where the growth is over the glottis or surrounds it the respiration becomes seriously interfered with.

## Treatment.

*Treatment* is purely surgical.

## APHONIA—LOSS OF VOICE.

## Aphonia.

*Aphonia* means absence of voice. The loss of voice may be temporary or permanent. It may be a functional or an organic disorder, and may be due to derangement of the structure of the larynx or the glottis.

## Physiology of aphonia.

*Physiology of Voice.*—In normal speech the true vocal cords approach one another so nearly as to project into the larynx as a vibrating membrane. The expiratory current throws them into vibration, and their tension gives rise to a pitch of tone. In disease of the larynx where the mucous membrane and also the vocal cords are swollen, the laryngeal muscles cannot act sufficiently to make them tense, and therefore the voice becomes low. Where the swelling of the cords is intense, they remain relaxed, and the voice is either silent or cracked. The cords may also become affected by spasm or paralysis.

## Causes.

*Causes.*—Aphonia may be due to local inflammation, to

subsequent serous exudation, to deposits, or to specific or non-specific ulcers of the larynx and glottis. In many cases external causes, as pressure of a tumour, and occasionally diseases of the nervous centres, may lead to it. Hysteria and other functional disorders, as deranged uterine functions and irritation of the ovaries, also give rise to it. Lead and arsenic poisoning have the same effect. Syphilis is a common cause.

*Symptoms.*—When due to organic causes it is generally permanent, and the patient generally speaks in a whisper. In functional disorders, after a time the power of the voice returns. That due to organic causes can be best distinguished by the laryngoscope from the functional ones.

*Treatment.*—The cause must be sought for and removed. Iodide of potassium internally does good. Nervine tonics and electricity may be tried.

## LARYNGISMUS STRIDULUS.

### (SPURIOUS CROUP.)

Spurious  
croup.

It is a croup-like inspiration of infants, and was thought a variety of asthma by Hippocrates, and till recent times by Galen. At first the child struggles for breath, next draws a crowing inspiration like that of croup and whooping cough, and is dependent like them on closure of the rima glottidis. It is paroxysmal, varying in frequency, and may continue for months. From ten to forty attacks occur in twenty-four hours. Where remissions and exacerbations occur it is generally due to advance of successive teeth. Where it ends fatally, usually spasmodic convulsions occur. It is often complicated with other disorders. It is an accompaniment of whooping-cough and of epileptic seizure. May be due to hysteria or to local irritation of the larynx from any cause. Is often fatal when it occurs in young children.

## Pathology.

*Pathology.*—The spasm is known as spasmodic croup. It is purely of a nervous origin, having no inflammatory cause. Is not attended with any structural change. The affection is perhaps due to irritation from pressure of enlarged glands in the neck or chest upon the recurrent nerve, or some part of the eighth nerve, the irritation being conveyed by the vagus or the recurrent laryngeal nerve to the vocal cords, which are then thrown into spasm. The irritation may also arise from the brain, as in hydrocephalus, from any organic cerebral mischief, or from morbid growths, as enlarged thyroid, or may be due to reflex causes, as thread-worms, teething, fright, anger, emotions.

## Causes.

*Causes.*—It is a common complaint in children, and those exposed to unfavorable hygienic conditions. Damp situations predispose to it. Indiscretions of diet aggravate it. Dentition, inflamed scalp, various intestinal and head affections, bronchitis, pulmonary diseases, and pericarditis are its exciting cause. The scrofulous and rickety are more subject to this affection than others. In adults, although rare, it occurs in connection with hysteria, or is the result of some pressure on the laryngeal nerves. There is great tendency to a recurrence. Causes of the paroxysm, straining of the body, as by violent exercise, crying, coughing, any abdominal distension, sudden awaking from sleep, give rise to the fit.

## Symptoms.

*Symptoms.*—Spurious croup sets in very suddenly at night and during sleep with more or less intense dyspnoea, and the glottis may be completely closed, so that respiration suddenly ceases entirely. The child struggles for breath, and appears livid in the face; very often there are convulsions, or partial contractions of the flexors of the thumb, fingers, and toes. These are followed by relaxations of the involuntary muscles. The attack subsides suddenly or slowly, and when it ends the child generally cries.

The voice is generally not affected ; there is no cough, no fever.

*Terminations.*—Recovery is almost certain, but rare cases have ended in death from suspended respiration, or by stagnation of blood in the heart, lungs, or brain. Terminations.

*Diagnosis from true croup.*—Spasmodic croup has sudden accession and sudden departure, there is free breathing between the paroxysms, and absence of fever, hoarseness, and paroxysmal cough. Diagnosis.

*Treatment.*—During the fit relief may be obtained by shaking the child, by dashing cold water in the face, by tickling the throat so as to excite vomiting, and by warm bath with cold douche on the head. An emetic is needful if it can be taken. Enemata of antispasmodics may be tried. Artificial respiration is sometimes serviceable. If spasm be due to reflex irritation the cause must be removed. In prolonged cases chloroform inhalation may be tried. In hysterical spasm the inhalation of chloroform at once restores the patient. Where spasm is due to ulcers in the larynx the best local application is nitrate of silver, and if due to œdema scarifications of the glottis. Lancing of the gums may be necessary in some cases. Tumours may be removed by surgical operations. Where all remedies fail, and danger is imminent, as a last resource tracheotomy may be performed. During the intervals attend to the diet, to the state of general health, and to the conditions of the alimentary canal. As the disease depends upon rickety state give cod-liver oil. Change of situations, warm clothing, and sea bathing are useful. Treatment.

### PARALYTIC AFFECTIONS OF THE LARYNX.

Paralytic affections of the larynx may be due to hysteria, to diphtheria, or to organic cerebral disease. The affections involve the trunk of the pneumogastric, the recurrent

Paralytic  
affections of  
the larynx.  
History.



laryngeal, the superior laryngeal nerves, and the vocal cord.

*Paralysis of the recurrent laryngeal nerve* may be due to aneurysm or cancer or any other growth in the lower part of the neck; it may be thyroid body. In this paralysis there is aphonia and occasional dyspnœa.

*Paralysis of the superior laryngeal nerve* is rare. This nerve is a sensory nerve of the larynx, and supplies motor branches to the crico-thyroid muscles, and in conjunction with the recurrent nerve, also supplies motor branches to the arytenoid muscles. Thus, in paralysis of this nerve we have complete anæsthesia of the corresponding side, and total inability of the corresponding cord to act. There is hoarseness of voice and inability to utter high notes. There are perfect movements of the abductors and the adductors, and inability of the affected cord to act.

*Paralysis of the vocal cord.*—Complete unilateral paralysis is rare. The paralysis involves the pneumogastric nerve, and induces loss of motion and sensation on the affected side. It is often associated with ordinary hemiplegia, and there is aphonia and occasional dyspnœa.

**Causes.**

*Causes.*—Paralysis of the larynx may be due to tumours pressing upon the cords, or to diseases in the medulla, or to division of the laryngeal nerve in the neck.

**Symptoms.**

*Symptoms.*—It may be *bilateral of adductors*, where the vocal cords are quite motionless; or may be *unilateral of adductors*, where the voice is altered during coughing, and sound of voice is changed and weakened. In this affection one vocal cord only is congested and unable to act. In *bilateral of abductors*.—The voice is harsh. There is great dyspnœa, with noisy stridulous inspiration, increased on any exertion. The cords lie close together in median line, and do not separate during inspiration. In *unilateral of abductors*.—The breathing is noisy, there is

dyspnoea, and the affected cord does not move from the median line.

*Treatment.*—Where aphonia is due to nervous disorder, and is functional, the removal of the cause cures the complaint. The paralysis, if intrinsic, may be relieved by Faradization. Treatment.

### DYSPHONIA.

Dysphonia.

#### (CLERGYMAN'S SORE THROAT.)

This word literally means difficult or painful voice, otherwise called dysphonia clericorum. Definition.

*Causes.*—It may originate in catarrh of the larynx, and may be the result of overexertion or of persistent use of the voice. Cause.

*Pathology.*—It is a chronic affection, and consists in irritation of the lining membrane of the fauces and of the larynx. In severe cases a series of morbid changes take place, as congestion, inflammation, or relaxation of the mucous membrane of the fauces; enlargement of the tonsils; elongation of the uvula; or inflammation, ulceration, or morbid deposits on the mucous follicles of the pharynx and larynx. Pathology.

*Symptoms* are those of chronic laryngitis, but more mild. Symptoms.  
The patient complains of an uneasy sensation in the throat, and frequent desire to swallow as if there were some obstacle in the throat which can be removed by deglutition. He also attempts to clear the throat by coughing or hawking, and points to the throat as the seat of pain. These symptoms are soon followed by loss of power over the voice, which is chiefly felt towards evening. On examining the throat by the laryngoscope we find the mucous membrane presenting a granular appearance, and covered with a yellowish substance, and mucus and pus adhering to the palate, and also to the velum palati. The disease may be idiopathic and exist alone, or may be secondary

and follow inflammation of the larynx, and of bronchi and phthisis. In this affection there is a special tendency to hypertrophy of the laryngeal glands.

Treatment.

*Treatment.*—In the early stage, tonics, shower baths, sea bathing, change of air, and moderate occupation do good. If the case has advanced, nervine tonics, various preparations of iron and strychnine, will prove efficacious. Locally caustic solution of one drachm of nitrate of silver to an ounce of water may be applied by a brush to the larynx alone, or also to the parts immediately behind the epiglottis. The application may be used every other day, and continuously for two or three weeks. Very often the medicated solution is spread over the diseased surface in a minutely divided and misty shower, by an instrument known as an atomizer or a spray producer. To prevent recurrences the throat should be properly covered with flannel; the beard ought to be allowed to grow. If the tonsils are enlarged and indurated various astringent gargles and medicated vapours may be employed. Frequently relief may be obtained by excision of one or of both the tonsils. The patient should avoid the use of the voice.

Edema  
glottidis.

### ŒDEMA GLOTTIDIS.

Definition.

It often follows acute laryngeal catarrh. It is a highly dangerous affection, and soon causes death by speedy suffocation. The disease causes closure of rima glottidis, owing to the swelling of the mucous membrane lining it, or from serous effusion into the subjacent areolar tissue.

Causes

*Causes*—It may be due to cold, or to swallowing of boiling liquids, or may follow upon some laryngeal disease, or may occur as a complication of erysipelas, or of Bright's disease.

Symptoms.

*Symptoms.*—Sore throat is complained of, and the pain is referred to the *pomum adami*. There are sensations of the presence of a foreign body; great dyspnoea; the in-

spiration being of a hissing character, protracted and laborious, the expiration is free and easy. There is marked dysphagia, the voice is hoarse, or is completely lost. There is a peculiar harassing cough, with high fever, flushed face, and livid lips. These symptoms are rapidly followed by restlessness and a feeling of suffocation, and are attended with drowsiness, delirium, and coma. The disease is often fatal, death taking place very rapidly.

*Terminations.*—Death takes place in from twelve hours to the fifth day. Recovery occurs, or the disease may pass on to chronic inflammation. Terminations

*Treatment.*—The patient should remain in a warm room, and the air must be rendered moist by hot steam. The throat must be warmly covered. Inhalation of steam is one of the best methods adopted. As the act of swallowing is attended with intense suffering nutrient enemata are employed. If there be much spasm the chloroform inhalation, or the steam or the vapour of boiling water either alone or medicated with anti-spasmodics, or the spray of the solution of belladonna, may be tried. A sponge dipped in boiling water should be constantly applied to the throat. If these remedies do not act favorably, and if the distress be increasing, and if the blood is not properly oxygenated, tracheotomy must at once be performed. By this operation the larynx is allowed perfect repose; while the paroxysms of spasmodic suffocation and the danger of the disease extending to the lungs are prevented. Treatment.

## TRACHEA.

Trachea.  
Anatomy.

*Trachea* is a portion of the respiratory tract. The air in breathing passes into the trachea, the walls of which are rough and irregular in three fourths of their circumference, and bounded with strong cartilaginous rings. In it the admission and exit of air is always great and quick. History. These cartilaginous rings, as they go downwards, become



indistinct and even altogether lost, and in those places they are smooth on their internal surface. During health the mucous membrane lining this respiratory tract is smooth and sufficiently moist. In disease it becomes dry and rough at first, and subsequently very moist. In it various sounds are produced; they are the result of air travelling over these and other respiratory tracts, either when dry or when moist.

Tracheitis  
catarrhalis.

### TRACHEITIS CATARRHALIS.

Definition.

*Tracheitis catarrhalis* is an inflammation of the trachea, and is due to the same causes which give rise to catarrhal laryngitis or bronchitis. As idiopathic it is very rare, and may be due to extension of inflammation from without or of morbid processes, as during the progress of some growths within.

Symptoms.

Symptoms, morbid appearances, and treatment are all allied to those of laryngitis.

Foreign  
bodies.

### FOREIGN BODIES IN THE LARYNX, TRACHEA, OR BRONCHI.

*Foreign bodies in the air passages.*—These consist of peas, stones, buttons, cones, and may give rise to severe and fatal mischief. When the foreign substances are of an organic nature they imbibe moisture from the passages, and swell considerably, so that a pea swells to three times its original size. When they remain in the passage for any length of time they form a nucleus, around which are deposited mucus, lymph, &c. They often become lodged into one of the ventricles of the larynx, or become fixed between the vocal cords or are retained into the trachea, or they may descend into the bronchi, chiefly into the right, and being lodged lead to collapse of the lung.

Symptoms.

*Symptoms.*—During inspiration suddenly a foreign body

enters the larynx, and if not expelled with violent expiration it at first sets up irritation in the part where it may be lodged, and gives rise to violent, spasmodic, irritating cough, to dyspnoea, and to a sense of suffocation. In some cases even the respiration becomes arrested. These symptoms often subside for a time and then return within twenty or thirty minutes. If the foreign body be in the larynx there will be violent, harassing, suffocative cough, loss of voice, or inability to speak except in a whisper, pain and tenderness over the affected part, and difficulty of swallowing. The respiration is of a hissing character, and may be attended with dyspnoea. If it passes onwards it is then carried into the right bronchus more than into the left, it being directed to this side by the bronchial septum; here the air cannot enter the right lung, or, if any, it only enters partially. Percussion denotes diminution of resonance on the affected side, and on auscultation the respiratory murmur is altogether absent. If the body remains long in the air-passages it leads to inflammation of the lungs or to gangrene.

*Terminations.*—It may end in recovery and the foreign body be removed, or may end in death from suffocation by its lodging into the larynx or from the consequences of inflammation or from spasm. When the substance is lodged between the vocal cords or entangled in the ventricles of the larynx it can be easily seen by the laryngoscope and removed. The inflammation of the mucous membrane often goes on to ulceration, and the ulcers being limited to the tissues in contact with the foreign body; it is also attended with muco-purulent secretion. If the body be lodged in one of the bronchi, it leads to pulmonary collapse or to inflammation of the corresponding lung. Abscesses often form at the seat of obstruction. Very often pulmonary emphysema, and in a few cases pleurisy with effusion, is the result. Terminations

Treatment.

*Treatment.*—Nature attempts to remove it by violent fits of coughing or of dyspnœa; assist nature, therefore, by sternutatories and by emetics. When the body is fixed into the larynx, the laryngotomy, and if lower down, the tracheotomy, may be performed. If the operation fails to dislodge the foreign body, the patient's whole body should be inverted and a few smart taps often removes it. The operation often saves the ill-effects of œdema or of spasm of the glottis. Very often the patient, being turned topsyturvy or the spasm of the glottis overcome by chloroform inhalation, the foreign body may be removed without operation.

Influenza.

## INFLUENZA. EPIDEMIC CATARRH.

Definition.

*Influenza* is a catarrhal affection of the respiratory tract of short duration, but is attended with prostration. Its origin is obscure, the disease spreads with extreme rapidity, but the duration of the epidemic is usually short. It is said to be due to a peculiar contamination of the atmosphere. Its prevalence has no relation to season or climate, nor to any local sources of bad hygiene. It is certainly contagious, and has a specific influence in its epidemic diffusion. It is said to be carried by fomites and by breath.

Symptoms.

*Symptoms.*—The period of incubation has not been precisely ascertained; it may be three or four days, or at most a week. The *invasion* is sudden and is marked by high temperature, chills and rigors, and sensation of cold along the back, alternating with pain, uneasiness, and heat and dryness of the skin; there is watering from the eyes and nose (coryza, sneezing), also frontal headache, with cough, restlessness, and tenderness of the fauces; and dyspnœa, with constriction about the chest. The skin is dry, the tongue is covered with a moist fur,

the appetite is lost, the bowels are confined, and the urine is scanty. The catarrhal symptoms are at their height on the second or third day of the attack, and begin to subside on from the fifth to the seventh day. The decline often ends in complications. As sore throat, acute bronchitis or pneumonia, or the dyspnœa becomes less, and the cough ceases after profuse expectoration ; or the disease may end in a crisis, which may be accompanied by diarrhœa, or profuse sweating, or diuresis. Occasionally the herpetic eruptions appear about the lips. The duration is from one week to twelve days.

*Prognosis* is always favorable.

Prognosis.

*Treatment*.—The patient should have perfect rest and nourishing diet. If the catarrhal symptoms be urgent apply a sinapism to the chest, and give ipecacuanha, conium, hyoscyamus, lobelia, or opium, by the mouth, also give inhalation of hot steam. If the prostration be extreme, give stimulants. During convalescence or subsequent debility tonics, cod-liver oil, bark, and phosphoric acid may be tried.

Treatment.

## WHOOPIING-COUGH (PERTUSSIS).

Whooping-cough.

It is characterised by a hard convulsive cough, occurring during expiration, and accompanied by a long, shrill, and laborious inspiration, which is called a whoop. The cough is paroxysmal, and is terminated by the expectoration of tough phlegm, and often by vomiting. It is a disease of childhood, and is infectious, generally sporadic, and often epidemic. It resembles various zymotic diseases, is like them contagious, runs a definite course, attacks in many cases once during life, depends upon a morbid state of the blood, and is due to the introduction of some specific poison, which has the peculiar power of irritating the pneumogastric nerves, and thereby irritating the bronchial mucous membranes, and thus giving rise to paroxysmal cough.

Definition.



## Causes.

*Causes.*—That it may occur from simple exposure to cold is doubtful. It may follow an attack of measles. It occurs in children even during the first few months after birth; is more common in girls than boys.

## Pathology.

*Pathology.*—Whooping cough, so far as morbid appearances go, is simply bronchitis. Its infectious character points to a specific poison, while its peculiar cough seems to indicate affection of some nervous centres.

## Post-mortem appearances.

*Post-mortem appearances* are those of the complications. Occasionally the bronchial glands are enlarged; there may be extensive collapse of the lungs, with general dilatation of the bronchi. The dilatation may be due to violent respiratory efforts which cause the whoop, and other post-mortem appearances of simple non-specific bronchitis.

## Symptoms.

*Symptoms.*—For convenience of description it is divided into three stages. Incubation varies from five or six days to three weeks. 1. *Invasion* or catarrhal stage, or stage of more or less fever, begins with a simple catarrh, as coryza, sneezing, injection of the conjunctivæ, with severe dry irritative cough, or cough attended with slight mucous expectoration. The cough is incessant and occurs during the day as well as at night, and the paroxysm occurs several times in a minute. At the end of this stage the symptoms generally become modified. The fever subsides or disappears, and the irritative cough is now replaced by a paroxysmal cough when the second stage is established.

Second stage.  
Convulsions.Before  
paroxysm.

2. Stage of increase, or stage of convulsions, or of spasmodic cough. In it, just before the paroxysm sets in, the child seems anxious and restless; if lying down, rises up suddenly; if playing, runs to hold some fixed object for support. The disease is of a peculiarly convulsive character; the cough is dry, spasmodic, and sonorous, also prolonged and suffocative; it consists of a succession of short, rapid expirations, accompanied by a peculiar, long, deep, inspiratory shrill, known as a whoop. This whoop

is caused by the forcible entrance of air inwards through the narrowed glottis. The cough is attended with a ropy mucous expectoration. During the paroxysm the head, neck, and face become purple and swollen, the eyes are watery, and appear to start from their sockets; and there is vomiting of food. After the fit is over the child is fatigued and exhausted. In severe cases bleeding from the nose, mouth, or even from the lungs, occurs. In some children a state of syncope or of insensibility without convulsions, and accompanied by great paleness of the surface occurs after many paroxysms. Where convulsions also occur the case is generally fatal. In cases attended with convulsions the cough is accompanied by violent struggling of the limbs and body, and by deep blueness of the hands and feet, as occurs in cyanosis. In some cases, after the fit is apparently over, the child begins to cough again, and may thus have several fits following one another in rapid succession. The paroxysm generally lasts from about forty seconds to two minutes or longer; is often excited by trivial circumstances. They occur more frequently during the third or fourth week, after which they remain stationary for two or three weeks, and then gradually decline. They are apt to be prolonged by a sudden change in the weather, or by neglect of hygiene, or by complications. The disease is rarely fatal in the absence of any complications. It is said to be the most fatal of all the diseases of children under one year of age, and 68 per cent. of all the deaths from it occur under two years of age, and only 6 per cent. above the age of five years.

During  
paroxysm.

After the fit.

3. The third or stage of decline commences from the time when the disease is on the decline. The child appears well and plays if the fit has ended in vomiting; the child soon after asks for something to eat. The paroxysms are less frequent, less violent, and the cough again becomes

Third stage.  
Decline.

catarrhal and loses its spasmodic character, the health improves, and the sleep becomes sound and tranquil.

Complica-  
tions.

*Complications.*—*Emphysema* follows or often accompanies it. The vesicular variety is more common, and generally disappears with the primary disease. *Emphysema* is the result of laceration of the air-cells, and it spreads through the lung to the connective tissues of the neck, face, and chest. *Catarrhal pneumonia* is also a common complication. In it the child continues feverish throughout the attack; the breathing continues hurried throughout the paroxysms of cough; the expectoration becomes foetid and glairy, and the paroxysms are not followed by vomiting of food. As the case progresses the physical signs of pneumonia become developed.

Emphysema.

Pneumonia.

Pulmonary  
collapse.

*Pulmonary collapse.*—Is a very unfavorable complication, for even in favorable cases the collapse terminates in general debility. Pulmonary collapse is common where there is rachitis. In rachitis the ribs are soft, and therefore yield readily to the atmospheric pressure, and also to the contraction of the diaphragm. In them the respiration therefore becomes seriously affected, and thus, during convulsive cough or whoop, collapse results.

Cerebral  
convulsions.

*Cerebral convulsions.*—This complication is very common in children, and occurs during dentition. During the attack of whoop the child gets chills and rigors, followed by burning heat on the surface of the body, and pain in the head. The eyes are fixed; the face is red; and the bowels are torpid. The child is averse to light or sound; and feels drowsy. There is grinding of the teeth, and startings from sleep.

Alimentary  
canal.

*Disordered alimentary canal.*—This complication is indicated by the coated tongue, the foul breath, the loss of appetite, by the tumid abdomen, and by offensive evacuations. Vomiting attends the paroxysms of cough, and if incessant, often leads to extreme emaciation, and debility.

The child also gets hectic fever; the breathing becomes hurried and oppressed; he picks his nose and lips; and may even suffer from *tabes mesenterica*.

*Sequelæ*.—Tuberculosis and scrofula are most common sequelæ. Phthisis after a long course of pneumonia is likely to occur. Very often it terminates in general debility, and also in cases of rachitis, where the ribs are yielding, and give way to atmospheric pressure, the chest is drawn in. Sequel.

*Diagnosis*.—In the first stage the whooping-cough may be mistaken for a simple bronchitis. If there is history of possible infection, or if the patient be of the proper age for whoop and be stated not to have had whooping cough; if there is vomiting with the cough, it is safe to predict that the true whoop will soon be heard. In the second stage the characteristic cough prevents mistake. Hysterical women occasionally simulate whooping-cough. Diagnosis.

*Prognosis*.—It is generally favorable. Complications are dangerous. So also if the disease occurs in very young children during dentition, or when the child is strumous, or very ill-nourished, or if feverish, and disinclined to take food, or if the cough be violent, the intervals of relief very short, but imperfect, and if the breathing be hurried, the sleep disturbed, and appetite very bad, there is great danger. If the child coughs more than twelve times in a day the case may be considered serious; if more than thirty times it is almost certain to be fatal. If the disease occurs during convalescence from fevers, or after measles or scarlatina, there is every probability to lung complications. Prognosis.

*Treatment*.—General. Remove the cause and prevent complications. Like smallpox or scarlet fever, it arises from a peculiar contagion in the atmosphere, and has a tendency to run a certain course uncontrolled. We must, therefore, allow it to take its course; only that the child should be warmly clothed, and kept on nourish- Treatment.



ing diet; and allowed free use of demulcents. Emetics with mild sedative expectorants may be given with advantage. Sometimes mild cathartics are required to relieve gastric symptoms. Never use bleeding or antiphlogistics. Tonics and antispasmodics are good. Where the spasmodic cough is very frequent, very violent, long continued, and the whoop is extremely shrill, and prolonged, it should be relieved by antispasmodics and chloroform. If not relieved the affection may exhaust the patient, or close the glottis for a few seconds, and thus arrest entirely the respiration, or may give rise to suffocation. Where vomiting is intense it may cause great debility and emaciation. In such cases even the mere existence of symptoms of whoop foretells danger, and, therefore, requires prompt treatment. Narcotics and antispasmodics, belladonna, opium, and hydrocyanic acid are extensively useful. Assafoetida and even bromides are often used with success. Emetics and nauseants are also useful remedies. Purgatives may be given if constipation be present. The specific drugs, or those which have attained high repute are bicarbonate of potash and alum; these shorten the fits of coughing surprisingly. Other remedies are sulphur, conium, and dilute nitric acid. For inhalations use fumes arising from gas works, which contain ammonia. The vapour of tar, and of several volatile oils, is a treatment which produces excellent results. Complications must be treated as they arise. During the interval attend to the Hygiene; avoid exposure to cold; keep the child on generous diet, and flannel always to be worn next to the skin. Locally use stimulant and sedative embrocations to the chest. If the secretions are excessive check them by nitrate of silver topically applied to the throat. A change of air always does good.

### BRONCHITIS.

Bronchitis.

Definition.

*Bronchitis* is an inflammation of the mucous membrane

of the bronchial tubes. It may be acute or chronic, and may extend to one or to both lungs.

*Causes.*—Some degree of bronchitis accompanies all lung diseases. It also occurs as an independent affection, as a result of catching cold and of the inhalation of irritants. Fur dressers, thrashers with the flail, fork grinders, knife-grinders, wheat-sifters, and persons following other dusty occupations are peculiarly liable to it. It is often an accompaniment of fevers, and always of measles. A previous attack and the existence of emphysema of the lungs are its chief predisposing causes. Causes.

*Post-mortem appearances.*—There is in the early stage redness, swelling, opacity, and relaxation of the mucous membrane; the surface is dry, or covered with scanty grey mucus. In advanced cases the secretions may be copious, may be mucus, muco-purulent, or purulent, with abundant epithelial cells. In some cases fibrinous particles or casts are found in the tubes. The inflammatory process may be limited to the mucous membrane, or may involve the whole thickness of the bronchial tubes, leading to infiltration and induration of the connective tissue which surrounds them. The muscular walls may be stimulated to undue action, or may undergo degeneration or atrophy. In most cases the mucous membrane becomes excoriated, and even ulcers form. The ulcers enlarge and increase in depth, and the cartilages often disappear by caries or necrosis, often involving in the destructive process the surrounding lung tissue. In some cases the tubes become gangrenous, and are converted into irregular channels. Very often such irregularity of structure occurs from over-accumulation of the contents of the tubes or by inflammatory weakening of their walls. Where the secretion is in excess the air-cells become disorganised, and also become distended with air, and emphysema results, or the cells become shrivelled up and collapse of the lung occurs. The col- Post-mortem appearances.

lapse often passes by insensible gradation into lobular pneumonia.

Symptoms.

*Symptoms.*—As regards the symptoms acute bronchitis presents various degrees of severity, according as the larger or the smaller tubes are affected. The term capillary bronchitis is sometimes applied when the small tubes are chiefly affected, and the older physicians who were without the aid of physical signs, saw, nevertheless, that, though this disease resembles pneumonia, it was not identical with it, used the term peripneumonia nota for capillary bronchitis. Capillary bronchitis has some peculiar features, due, however, to physical and not to pathological differences, when it is seen in new-born children. In mild cases bronchitis sets in with symptoms of nasal catarrh, sore throat, and febrile phenomena; the inflammation extends to the larynx and trachea, as is evidenced by a sense of tightness behind the sternum and tickling about the windpipe. In a more severe form restlessness is great, the fever is high, and there is great anxiety. The impeded circulation leads to lividity of the body and even of the finger-ends. The temperature is also reduced, and the nutrition is interfered with. Occasionally slight delirium, and in young and weakly children convulsions may occur. The fever is never very high. The temperature rarely exceeds  $100^{\circ}$  or  $102^{\circ}$ . The perspiration is profuse, but is alternated with dryness of the skin. Other neighbouring mucous surfaces are also the seat of catarrh. *Local.*—Heat, soreness, and actual pain over the supra-sternal notch; these symptoms are increased by any movement. There is also tenderness over the sternum; the respiration is somewhat hurried and laborious, but there is no dyspnoea; the cough is paroxysmal, often irrepressible, and is attended with dry expectoration, difficult to bring up, or there is a clear, thin, pearly white, frothy, mucous sputum, which is followed, from a few hours to a day or two, by a large quantity of opaque, viscid, sometimes adhe-

sive or ropy expectoration. If the attack be severe or prolonged, the sputum becomes muco-purulent, or distinct nummulated masses ; occasionally it may be streaked with blood. In favorable cases the fever decreases, the respiration becomes easier, the cough is less troublesome, and the expectoration becomes more free. In fatal cases the patient is unable to sit up in bed, and sinks exhausted on the pillow ; the breathing becomes more difficult and the lividity is more marked. He has no power to expectorate, and hence the sputum collects into the air-passages and causes death by suffocation. Death may also result from apnoea, due to the arrest of circulation in the lungs in consequence of the coagulation of blood in the pulmonary arteries and into the right side of the heart.

*Physical signs*—*Inspection*.—Respiratory muscles are in a state of powerful action. *Patpation* and *percussion* shows nothing abnormal. *Auscultation* reveals two dry sounds—rhonchus and sibilus. Both are supposed to indicate that the air-tubes are somewhat narrowed, owing to the dryness and swelling of the mucous membrane. After a time, as the secretion is poured out, large and medium crepitations or, as they are often called, moist sounds, are heard ; the air in passing through the bronchial tubes mixes with the secretion, and gives rise in the larger branches to large crepitation, and in smaller branches to medium crepitation. It is characteristic of the auscultatory signs of bronchitis that they are not localised, but are heard all over the chest, and that after the first stage, which is usually short, they are peculiarly mixed and constantly changing. The disease generally runs a favorable course.

Physical  
signs.

## CAPILLARY BRONCHITIS.

Capillary  
bronchitis.

It is common in children who are very young, and in old people, being comparatively rare in adults ; it has the same

Definition.



general features as the affection of the larger tubes, but is more severe in every other particular, and especially as regards dyspnoea. The cough is violent, and there is great restlessness.

Symptoms.

*Symptoms.*—The disease sets in with well-marked rigors, severe headache, pain, and sometimes vomiting; the pain in the chest may be slight or obscure; the respiration is difficult and hurried; the pulse and respiration ratio is considerably altered, it may be about three to one; the breathing is very much interfered with, although, except in new-born children, true dyspnoea is rare. The patient is obliged to sit up in bed; and there is violent cough, attended with abundant, viscid, tenacious expectoration, often streaked with blood. There is extreme prostration, considerable fever, with much exhaustion and weakness; the urine is scanty, high coloured, and slightly albuminous. The lining mucous membrane of the capillary bronchial tubes being thickened and congested and coated with viscid mucus, completely occludes the air from the lungs; and thus in bad cases symptoms of suffocation and of venous congestion, owing to the filling up of the tubes, set in. The cough often diminishes, anasarca of the feet and legs appears, with low muttering delirium; and there is coma ending in death. Favorable cases are those where the disease subsides in from eight to fourteen days after the attack. In children under a month old capillary bronchitis often causes extreme dyspnoea, and even leads to collapse. The child struggles for breath, and frequently becomes partially comatose, with cold extremities; it has no cough, and the severity of the symptoms is due to the fact that the child has not learnt the voluntary effort which is the commencement of the partially involuntary action of coughing.

Diagnosis.

*Diagnosis.*—Bronchitis requires to be distinguished from pneumonia, from pleurisy, and from phthisis. The physical signs enable the physician to make the distinction promptly.

In *pneumonia* and in *pleurisy* there is always well-marked impairment of resonance. In *phthisis*, when the impairment of resonance is not distinct, the rales are local and not universal as they are in bronchitis. The characteristic cough distinguishes *pertussis* from the non-specific forms of bronchitis.

*Prognosis.*—In capillary bronchitis death occurs from the sixth to the ninth day. Affection of the large bronchi is less dangerous, and relief generally occurs. It depends upon the age and constitution of the patient, upon the previous organic disease in the lungs or heart, and upon previous attacks. Signs of extensive obstruction, urgent dyspnœa, and presence of low adynamic symptoms are serious. In favorable cases the disease subsides; the relief is afforded by copious expectoration. Prognosis.

*Duration.*—The affection begins to decline between the fourth and the eighth day, or passes into a chronic form. Duration.

*Treatment.*—Keep the patient in bed, warmly clad in flannel, avoid exposure of the chest to damp or cold, diaphoretics, copious hot drinks, warm footbaths, all tend to produce free perspiration are needed. When the disease is established subdue inflammation, promote the secretions if scanty, and hasten their discharge; relieve cough, support the patient's strength, and treat urgent symptoms as they arise. In the early stage, if the patient be strong, vascular sedatives with expectorants may be given. If the secretions are scanty, free expectorants, and if profuse, a combination of them with sedatives or narcotics may be tried. To allay spasm of the tubes antispasmodics with demulcents, or with diaphoretics do good. Very often sedative inhalations as creosote or carbolic acid are beneficial to relieve cough, and to check spasm; they also diminish or loosen the sputa. *Locally.*—Mustard poultices, hot turpentine, or irritating liniments are useful. After the acute symptoms have subsided, blisters or croton oil Treatment.

liniments are serviceable. During convalescence care must be taken to guard against exposure to cold, damp, and night air; flannel must be always worn next the skin, and a change of air is desirable. In the bronchitis of newborn children the secretion must be removed at once from the bronchial lobes, or the child will die of apnœa. This is best effected by an emetic or by tickling the fauces with a feather.

### CHRONIC BRONCHITIS.

Chronic  
bronchitis.  
Definition.

*Chronic bronchitis* is very common in the labouring classes, and in persons of middle or advanced life; it may be idiopathic or may follow an attack of acute bronchitis. Very frequently it is associated with gout, syphilis, or rheumatism. It appears in advanced life in winter, and disappears in summer. It has a tendency to recur on the slightest provocation. Generally attacks of winter cough recur annually, increasing in severity and duration, and separated by shorter and shorter intervals of comparative health. Each successive interval becomes a period of increasing dyspnœa, till at last it merges into a continuous attack ending only in winter exacerbations. Every fresh attack resembles acute bronchitis at first, but the fever soon lessens, and the expectoration becomes profuse and muco-purulent.

Symptoms.

*Symptoms.*—The attack usually occurs during the winter, it has a tendency to recur, and generally towards the cold weather. The severity may vary. At times there is little or no uneasiness except slight cough and some expectoration. In some cases there is harassing cough in the morning, attended with copious frothy muco-purulent sputa or sputum resembling nummular of phthisis.

Winter  
cough.

*Winter cough.*—A variety of chronic bronchitis is known as winter cough. It is characterised by a sense of oppres-

sion about the chest, shortness of breath on any exertion, and a violent irritable cough occurring in paroxysms and very annoying when first going to bed, or on rising in the morning. It is attended with profuse expectoration, but the sputa being difficult to expel. The sputum is yellowish or greenish, and consists of mucus or muco-purulent matter. It usually runs into one mass, but occasionally it remains in separate lumps. It frequently sinks in water, and is sometimes most offensive from the decomposition. In very severe and advanced cases there is considerable wasting and debility, hectic accessions of fever, and night sweats. After repeated attacks these cases end fatally, and somewhat suddenly.

Characters of  
winter cough.

Cases of chronic bronchitis differ widely in their severity, and in their symptoms. In some cases the secretion is almost absent, other symptoms being well developed, and hence the disease is called dry bronchitis or dry catarrh.

Very often in old people chronic bronchitis is associated with profuse watery transparent or ropy, seldom frothy, expectoration. This is called *bronchorrhœa*. In them the cough is paroxysmal, and in severe cases there is rapid loss of flesh and strength. The physical signs are those of chronic bronchitis.

Bronchor-  
rhœa.

A form of bronchitis called plastic or *croupous bronchitis* is characterised by a fibrinous exudation, which is coughed up in the form of little branches of trees and long supposed to be pulmonary blood-vessels. It does not differ in its symptoms or physical signs from acute bronchitis, except in being very obstinate.

Croupous  
bronchitis.

*Complications.*—Chronic bronchitis is often complicated with dilatation of the right side, and subsequent hypertrophy of the heart, with hepatic and renal diseases, and consequent dropsy. It also leads to certain secondary changes in the lungs, emphysema and bronchiectasis and fibroid phthisis.

Complica-  
tions.



Treatment.

*Treatment.*—It is most important that the patient who has had one attack of chronic bronchitis should take every means to avoid another. He ought to wear flannel or silk next to his skin, and to avoid constipation or excessive food. When the attack is present the most important point is to keep him in a room of absolutely equal temperature. It is particularly important to take care that the temperature does not fall during the night. Purgatives and expectorants are the most useful drugs.

## BRONCHIECTASIS.

Bronchi-  
ectasis.  
Definition.

*Bronchiectasis* signifies dilatation of the bronchial tubes, and is one of the results of repeated attacks of chronic bronchitis, and may be a result of various chronic lung diseases, as emphysema or interstitial pneumonia. The dilatation may be one uniform and *cylindrical*, or consisting of several *bead-like* dilatations, or only one dilatation or several large dilatations of the *terminal portion* of the smallest bronchial tubes. It is often confounded with vomicæ which have been lined with a smooth membrane and are in direct continuity with the bronchial tubes.

Dilatations.

Cylindrical.

The dilatation of the tubes in their *whole length* extends from the large to the small branches, and even to their terminations in the air-cells. The dilations are rarely uniform. Their walls may be thick or thin or pulpy. In the large tubes their fibrous and muscular coats are firmer, and the interstices between them therefore form distinct pouches. The dilatations rarely affect one whole lung, they are only limited to a few tubes, and are often surrounded by a healthy lung, or by an emphysematous, or by a collapsed lung-tissue. This cylindrical dilation is generally secondary to chronic bronchitis, or more especially to capillary bronchitis.

Terminal  
portions.

Dilatation of the *terminal portions* of the smallest

bronchi are usually globular, they have a smooth, but thick, opaque, and tense internal surface, and they often communicate with small bronchial tubes. These pouches are seldom single, they are often in groups, or may be scattered throughout the emphysematous lung, and may affect the whole of one lobe or one lung. The lower lobe is most frequently affected, and is also diminished in size. These pouches originate in collapse, or lobular pneumonia, or in atelectasis. In them the accumulated secretion in the terminal bronchial tubes leads to destruction and ulceration of the walls of the tubes, and also of the surrounding tissues, and thus small cavities communicating with these tubes are formed. In the other variety or *bead-like* dilatations the lung-tissue is consolidated, and in it there are one or more cavities of irregular shape and sizes in the lung, and they open freely in one or more bronchial tubes. These cavities may be solitary, and involve the apex or the base of the lung, and are surrounded by dense fibrous tissue, which may extend around them for some distance into the lung-substance. The cavity is lined with a smooth membrane, which is continuous with that of the undilated part of the bronchus.

Bead-like.

*Symptoms.*—It is a chronic complaint. There is a progressive loss of flesh and strength, more or less dyspnoea on exertion, and severe paroxysmal cough, with abundant expectoration, which is also foetid. The foetor is due to the decomposition of retained sputa, which are also mixed with blood, and they also contain caseous matter.

Symptoms.

*Physical signs.*—Owing to the obstructed tubes the affected portion of the lung-tissue is in a state of complete collapse or of lobular pneumonia. In a majority of cases there is on percussion pulmonary resonance, with more or less rhonchus and crepitation on auscultation. In a few cases there is circumscribed dulness and absence of respiratory murmur over the dull part. Physical signs vary

Physical signs.

with the seat and extent of the dilatations, with the amount of their contents, and with the state of the surrounding lung. If the dilated tube contains air as well as liquid, the physical signs will be the same as in a phthisical cavity, and there is more or less retraction and immobility of one side of the chest, dulness on percussion, with large crepitation and gurgling. If the dilatation be small and deep seated and surrounded by the healthy lung, resonance will be more clear, and tubular sounds are generally detected over the middle and lower parts of the affected lung. The sounds are sometimes absent, but if so may be heard after the patient is made to cough.

Treatment.

*Treatment.*—Attention must be paid to the secretions, which must not be allowed to accumulate. If excessive an emetic will do good.

#### ASTHMA (SPASM OF THE BRONCHIAL TUBES).

Asthma.

Definition.

*Asthma* is characterised by periodic recurrences of contraction of the bronchial tubes and consequent severe paroxysmal or spasmodic attacks of dyspnœa. Very often dyspnœa of chronic bronchitis, of emphysema, or of heart disease, or that due to pressure of a tumour on the trachea has been falsely designated asthma. The word literally means to gasp for breath.

Pathology.

*Pathology.*—It is a nervous disorder dependent upon tonic contractions of the circular muscular fibres of the bronchial tubes. Any irritation, direct or reflex, acts as a stimulus to contraction. The irritation may be direct in the medulla oblongata, or indirect or reflex in the pulmonary portion of the pneumo-gastric nerve, and being thence transmitted to the medulla oblongata. From the medulla it is reflected to the circular muscular fibres of the bronchi.

*Varieties.*—Organic, as due to some lesion in the bronchi, may be spasmodic or paralytic; idiopathic, laryngeal, or hæmic, as due to morbid condition of the blood; and diaphragmatic, as associated with the spasm of the diaphragm or of the respiratory muscles. *Varieties.*

*Causes.*—It may commence at any period of life. It is more common in women than in men. The first attack is often traced to whooping cough, measles, or to bronchitis. It is a distinct hereditary disease, asthmatic parents generally begetting asthmatic children. It has probably relationship with epilepsy and other nervous disorders. In some a change of weather, or prevalence of particular wind originates the disease. Thus, some suffer most in a dry, others in a moist atmosphere; but, as a rule, moist air is more suitable for them than dry air, and a low site better than an elevated place. Direct irritation of gases or vapours, or of solids, or of odoriferous emanations from animal or vegetable matters, food, improper both in quantity and quality, and taken at irregular hours, high-seasoned diet partaken freely at night also originate the disease. It is often associated with bronchitis or emphysema, and with cardiac diseases, they giving rise to pulmonary congestion. *Causes.*

*Symptoms* are often insidious. The disease is preceded by an abundant discharge of pale watery urine, or by headache and sleeplessness, and various other nervous disturbances. It may come on without any warning. The patient awakes early in the morning with a sense of suffocation, a constriction about the chest, and violently struggles for breath. He attempts various positions for obtaining fresh air, stands erect, leans his head forwards on his hands, or on some support, thus making various breathing efforts, or the shoulders are raised, and the head is thrown back with the mouth open. Respiration is accompanied by a great wheezing noise, and yet hardly any respiratory murmur heard. The inspirations and expirations are performed with *Symptoms.*



the greatest difficulty ; the inspirations are very short and abrupt ; the expirations greatly prolonged, and are followed by great effort at expulsion. Signs of overloading of the venous system and of non-aëration of the blood soon set in ; there is no fever ; the pulse is small and feeble ; the eyes are staring ; the face livid ; the countenance anxious ; and the skin is cold and clammy. Duration varies from two or three to thirty hours. Generally, when the paroxysm ends, cough sets in, followed by expectoration of little pellets of mucus, free from blood or pus. The sufferer, as the paroxysm ceases, falls into a state of long-desired sleep. If the attack has been prolonged, the muscles of respiration feel sore all over for two or three days. Such patients are usually thin and round shouldered.

Physical  
signs.

*Physical signs.*—Are those of constriction of the bronchial tubes, and of interference with the passage of air.

Inspection.

*Inspection.*—The chest is enlarged and mis-shapen, the upper part being dilated, the lower compressed, especially in the lateral direction. The lung being inflated, movements of the chest are deficient or absent. The intercostal spaces, the supra-clavicular fossæ, and the epigastrium all sink in during inspiration. *Percussion* sound denotes hyper-

Percussion.

Auscultation.

resonance. *Auscultation* discloses feeble or absence of respiratory sounds where the tubes are contracted, or loud puerile sounds where the bronchi are free ; dry râles generally all over, but at the close of the disease moist râles may be heard. Usually both lungs are affected, but occasionally only one of them, and then the breathing is puerile or in excess on the sound side.

During the interval the patient enjoys good health ; the breathing is quiet and free ; he has an anxious expression of countenance ; the cheeks are hollow ; the voice rather harsh ; and he has an habitual slight cough. The attacks are generally periodic in their recurrences.

*Prognosis.*—Is uncertain. When the disease commences in infancy, it disappears altogether in middle life. When it comes on at an advanced age it is probably permanent. Where the attacks are frequent and severe, emphysema of the lungs and hypertrophy of the right side of the heart occurs. These organic changes are generally attended with diminution in the severity of asthmatic attacks, but there is development of permanent dyspnoea and of other symptoms of emphysema and of chronic bronchitis. The patient is generally miserable throughout; has often irrepressible cough; profuse expectoration; inability to lie down in bed; rapid tendency to venous congestion, cyanosis, and œdema of the legs, scrotum, &c. If these symptoms continue unabated, somnolence and coma supervene, and followed by death. Prognosis.

*Treatment.*—In cases where asthma is threatened, it may be averted by removing the source of irritation, and by drinking plenty of coffee. When the paroxysm has set in find out the cause and remove it. If the stomach is at fault give an emetic, or if the bowels do not work, give an enema. The spasm of the bronchi can be best relieved by sedatives and belladonna internally, or by inhalations. Some recommend inhalation of chloroform or of ether in these cases. Dhatura is said to act like a charm in some cases, sometimes cigarettes of nitrate of potash check the fit. Fresh warm air must be obtained. The sitting or kneeling posture with the elbows supported so as to raise the shoulders may be practised. Besides these means ice to the spine, or sinapisms to various parts of the chest may be tried. During the interval, attention must be paid chiefly to the condition of the alimentary canal and to the stomach, and to the functions generally. Improve the condition of general health by tonics, use cold shower-bath every day. If the expectoration be copious give astringents with sedatives. Various remedies have been tried. Some Treatment.

use large doses of iodide of potassium, others arsenic, with benefit.

### HAY ASTHMA.

Hay asthma.  
Definition.

*Hay asthma*.—An affection similar to asthma, and occurring generally in summer and during the time of ripening of grass is known as hay asthma. It is otherwise known as *hay fever*, or summer catarrh, or coryza. It is attended with cough, sometimes with prostration, and sometimes with asthmatic attacks at night. Hay asthma only attacks certain persons. Some get it every year, others escape it altogether after the first attack. During the fit the conjunctival, the nasal, and the bronchial mucous membranes are also affected. During the interval there are paroxysms of asthma and of dyspnoea.

Causes.

*Causes*.—Exciting.—The ripe sporules of grass which during the ripening of grass, float in the air, affect the air of the nostrils and the bronchi; very often inhalation of ipecacuanha powder has a similar effect.

Symptoms.

*Symptoms*.—Are those of violent catarrh, itching and swelling of the conjunctivæ and of the eyelids, and watering of the eyes; there is congestion, tumefaction and copious discharge from the nose, and irritation of the throat, there is pain in the chest and slight cough; there is dyspnoea with more or less sputa, and headache and ordinary symptoms of asthma.

The disease lasts for about two or three weeks.

Treatment.

*Treatment*.—Avoid the exciting cause; and with hygienic management, very often quinine, arsenic, nux vomica, and nervine tonics remove it altogether. The use of a respirator, and washing out of the nostrils and throat by weak solutions of quinine may be tried.

Diseases of  
the lungs.

### DISEASES OF THE LUNGS.

The anatomical conditions of the lungs have already been described with the anatomy of the larynx, trachea, and the

bronchi. The characters of the chest walls to be ascertained in health and in disease. A short account of the several methods of physical examination of the chest necessarily precedes the history of the several diseases which have distinguished chiefly by means of them. These are inspection, palpation, percussion, auscultation. It is convenient first to treat of these only in so far as they refer to the lungs. *Inspection* determines the shape and movement of the chest.

Physical  
examination  
of chest.

Inspection.

*Form in health.*—The *size* of the chest may be ascertained by inspection, and measurement. A transverse section of the chest approaches the figure of an ellipse in adults, and is nearly circular in children. There is always some relation between the breadth, depth, and length of the chest. Any change or disturbance in this proportion betokens disease or a tendency to it. Thus, any change in the length and height of the chest walls from above downwards, or any change in the direction of the ribs, or in the width of the intercostal spaces, or in the size of the costal angles, or in the arching of the spine, and of the sternum, or in the height of the shoulders, and in the proportion of the scapulæ all point to disease.

Form in  
health.

*Shape of a typical chest.*—Is ellipse. In new-born children the chest is almost circular; the axes of the ellipse being nearly equal. In adults the breadth of the chest is greater by one third than the depth. The instrument by means of which the shape of the chest is measured is called a *cyrtometer*. It consists of two pieces of thin lead pipe, of about a line in thickness, joined together by an india rubber tubing. The measurement of the right half of the chest is a trifle greater than the left by half an inch or an inch in most people.

Typical.

*Shape of a modified or a subtypical chest.*—They are known as—1. *Alar chest.*—Such cases are common in persons predisposed to phthisis. In them the angles of the scapulæ

Subtypical.

Alar.



project. The chest is narrow and shallow, owing to the greater obliquity of the ribs, which causes depression of the shoulders, and also increases the chest in length.

Flat.

2. *Flat chest*.—In this chest the cartilages of the true ribs lose their curve and become straight. The chest looks flat in front; the sternum is depressed below the level of the cartilages, which are wrongly curved. Such a chest indicates predisposition to phthisis.

Transverse constricted.

3. *Transverse constricted chest*.—It consists of deep depression of the chest walls in front, which passes outwards and downwards on both sides on a level with the xiphoid cartilage. It is due to the want of air to expand the bases of the lungs during childhood. This variety in some degree may often accompany any of the others.

Pigeon breast.

4. *Pigeon breast*.—In this variety the true ribs are almost straight in front of their angles; the sternum is projected forwards; the transverse diameter of the chest is greater, and a horizontal section of the chest tends to form a triangle. It is common in rickets, and arises from impediment to free inspiration, and also from the fact of the ribs being unnaturally yielding. Chronic pulmonary catarrh and whooping cough

Rickety.

also lead to it. 5. *Rickety chest*.—It is partly a transversely constricted, and partly a pigeon breast chest. It is common in children in whom the respiration is chiefly abdominal. The chest at first is of a circular shape, and when the diaphragm descends, the air in the lungs becomes rarified; the ribs yield in their softest places to the atmospheric pressure from without, and are bent inwards, and at the softest parts of the ribs, which are at their junction with the costal cartilages, a depression is formed.

Form in disease.

*In disease*.—Inspection, palpation, and mensuration of the shape and size of the chest. These are *bilateral*, *unilateral*, and *local* changes. The two former indicate disease of the lungs or of the pleuræ; the local changes

point to the disease of the lungs, heart, or their serous lining membranes.

1. *Bilateral change*.—It may be enlargement or diminution. *Enlargement*: by deepest inspiration in health a considerable increase in the breadth and length of the thorax can be produced. This change also occurs in disease as in emphysema and in pleuritic effusions. In emphysema the chest is barrel-shaped, almost cylindrical, and arched forwards and behind, and the arching of the chest is most marked in the upper part of the sternum, which is bent forwards more than the lower part. *Diminution*.—This can be produced in health by the deepest expiration. In disease as phthisis this diminution commonly occurs.

Bilateral  
change.

Enlargement.

Diminution.

2. *Unilateral enlargement and diminution*.—*Enlargement*: occurs in disease. One side is comparatively larger than the other. In it the shape is rounder, the semi-transverse diameter shorter, and the antero-posterior longer. The length from above downwards is diminished, the affected shoulders are raised, and the spine is curved towards the unaffected side. It may occur in consolidation of the lungs, in pleuritic effusion, in compensatory lung hypertrophy, in rapidly growing soft cancer, and in active hæmorrhages. *Diminution*.—The change is only on one side. The circumference and the antero-posterior diameter are diminished, and the chest is flat before and behind, and is also angular; the ribs lie close together, the affected shoulder is lowered, and the spine is curved towards the healthy side. The pleura of the affected side is adherent, owing to pleurisy, or to phthisis, or to cancer. Occasionally it occurs in children where there is collapse of one lung.

Unilateral.  
Enlargement.

Diminution.

3. *Local change in the shape of the chest*.—It may be local bulging or shrinking. *Local bulging* occurs in circumscribed pleuritic effusions, in pericardial effusions, in hernia of the lung, in hypertrophy, and in dilatation of the heart, in limited emphysema, in aneurysm, in

Local change.

Bulging.

cancer and in other tumours. In enlargement of the heart and of the pericardium the bulging is traced upwards between the seventh and the third left ribs. It also extends from the left to the right nipple. *Local shrinking.*—It may be due to intra-thoracic diseases, and is attended with pleuritic adhesions, and is most common in phthisis where shrinking of the apex of one side occurs..

*Movements.*—It varies according to age and sex, and can be best, measured by an instrument called the spirometer. During health the number of respirations are from 18 to 20. *In disease*: movement may be absent on one side, or there may be too rapid or too laboured respirations. Dyspnœa is then said to exist.

*Dyspnœa.*—The word signifies difficulty of breathing. It may be due to the diminution of the breathing surface, or to obstruction to the bronchi by catarrh, or to the pain during respiration, or to the fever where calorification is much increased, as in acute phthisis.

When only one lung is disorganized, the capillaries of the other sound lung are useful for oxygenation of the blood, and its air-cells breathe at normal rate so long as they are quiet. During disease of both lungs the remaining healthy air vesicles become strongly distended, and they therefore inspire and expire more air, and lead to dyspnœa.

*Varieties.* *Varieties* are due to the perversion in the character of the respiratory movements. These are—

1. *Inspiratory dyspnœa.*—This occurs when the chest walls are yielding. It occurs in obstruction; in spasm or stricture of the larynx or trachea; in cedema of lungs; in hydrothorax; and in pulmonary catarrh in rickety children.

2. *Expiratory dyspnœa.*—In this variety the expiratory movements are exceedingly prolonged and laborious. It is due to impediment to expiration in the upper air passages, and where the expiratory power of the lung is diminished as in emphysema and in congestion.

3. *Non-expansive inspiration*.—In this the chest walls are elevated powerfully, yet not expanded. This occurs in pleurisy with effusion, in pneumo-thorax, in dense pleural adhesions, in phthisis, cancer, or in cases where the lung is impermeable to air. A certain proportion between the movements of the chest and abdomen should exist, and any variations deserve notice. Non-expansive.

4. *Thoracic breathing* occurs in diseases which interfere with the action of the diaphragm, in paralysis of the diaphragm, in great pericardial effusion, in abdominal tumour, in ascites, or in peritonitis. Thoracic breathing.

5. *Abdominal breathing*.—Is a male or an infantile type of respiration carried to extreme. In this the respiration is carried on chiefly by the diaphragm. This occurs in spinal paralysis, in tetanus, in pleurodynia, pleurisy, and in phthisis. Abdominal breathing.

*Palpation* consists in placing the hand over the chest, and it determines the movements and the vocal thrill, thus confirming the results of inspection and adding further information. Palpation.

*Vocal thrill*.—*In health*: it is a movement produced when a person speaks, and can be felt by the hand upon the surface of the chest. It is strongest over those parts of the lung where there is not much fat, is more intense on the right, than on the left side. Can be best made out by making the patient say “hah.” *In disease*.—It is diminished or altogether abolished in cases which render the lung impermeable to air or whatever causes separate the lung from the chest walls. Thus in consolidation, in pleuritic effusion, in pneumonic exudation, in massive phthisical solidification by tubercles, in cancer, the thrill is abolished. It is increased in cases where the lungs are traversed by large open air tubes or cavities. *Fluctuation*. Vocal thrill. In health.

—It is felt when the intercostal spaces are widened and tense, and when there is fluid in the chest. In disease. Fluctuation.



Percussion.

History.

Superficial.

Deep.

Pulmonary  
resonance in  
health.Resonance.  
Typical.

*Percussion* is done by striking the chest directly with the fingers or indirectly through the medium of a finger or a pleximeter. The sounds so produced have reference to the presence or absence of air in the part percussed. It may be *superficial* or *deep*; may vary from the gentlest tap to the hardest heavy stroke, by which means we could detect a change of note due to substances considerably removed from the surface. Thus, a superficial percussion gives resonance over the hepatic region, due to the thin layer of super-imposed lung, for an inch or two below the right nipple, while a deep percussion produces a dull note due to the subjacent liver. By percussion we also discover the character of the sound, the degree of resistance or elasticity offered, or the duration of resonance of the part struck. Percussion sounds possess a certain loudness, pitch, and duration. The sound that is produced by vibration of a stretched membrane is called a note; and as a string requires a bow to produce it, so does a membrane require a cavity. The sound thus produced is called a resonant sound.

*Extent of pulmonary resonance in health.*—It extends from the apex of the thorax on each side as low as the sixth rib in front, the seventh at the sides, and the tenth or eleventh behind. The viscera encroaching upon these limits are—the *heart* which causes some amount of dulness in front and left side of the chest; the *liver* which can be detected on the right side and on deep percussion as high as the fifth rib or the fourth intercostal space in front, and ninth or tenth rib behind; the *spleen* causes dulness on the left side of the chest below the sixth rib in the axillary region; the *stomach* has its own resonance, which varies in extent but may exist normally as high as the fifth rib. During health the resonance produced by percussion is called *typical* resonance, and when one side of the lung is diseased, the typical resonance may be referred to the

other sound side ; but when both sides are diseased, as often happens, then only one portion is more defectively resonant than the other, and the comparison is still useful.

The *tympanitic* resonance is the lowest in tone and longest Tympanitic.

of all percussion sounds. *Tubular* resonance, or that produced by percussion over the trachea, is high pitched, and Tubular.

of shorter duration. *Pulmonary* resonance is a sound Pulmonary.

produced by percussion over the healthy lungs, whose pitch can only be ascertained by experience. It is a sound midway between tympanitic and tracheal sounds. Thus, in a scale of resonance the pitch is progressively raised, and the duration progressively diminished as we ascend from the tympanitic to the tracheal sounds.

*Causes.*—Resonance may be produced by air in a sac or Causes.  
a vesicle or in a cavity of a considerable size, or in several small cavities subdivided, as in the lungs. The sac or cavity may be completely closed or may be partially open. When closed it is necessary, in order to produce resonance, that the walls of the cavity should generate the sound, and also be capable of transmitting it. In order to generate a sound the internal surface of the cavity should be smooth, so as to reflect the undulation, and to vibrate with the contained air. For this purpose the walls should be moderately tense, as is best exemplified in the tympanum of the ear.

When the sac is partially open a resonance is also produced, but the tone of voice soon passes out into the external air. Thus, by percussing on the cheeks while quite relaxed, and the mouth being shut, no resonance is heard ; but percuss it again when the mouth is open, and a subtympanitic resonance results. Again, open the mouth to its full width, and the pitch will be still higher.

*Percussion sounds of the chest in disease.*—The force used during percussion being equal, if the lung sound elicited on both sides be not the same, we may presume

Percussion  
sounds in  
disease.

the existence of disease, but it is to be remembered that the greater the rigidity and fatness of the chest walls, the less distinct will be the resonance produced. The percussion sounds include *resonant* sounds, *non-resonant* sounds, and *metallic* sounds.

Resonant  
sounds.

*Resonant sounds.*—The sound produced by percussion may be either an increased or a diminished resonance.

Increased.

*Increased resonance.*—When the resonance is increased the sound becomes tympanitic or clear; as is best heard in pneumothorax or in emphysema, where the column of air in the cavities is unusually great. A clear tracheal resonance, or one similar to that produced by percussing on the trachea occurs in a limited portion of the chest, and is detected in cases of relaxed lung tissue close to the chest wall; in pleuritic effusions; in pulmonary consolidations; in tumours or enlarged organs pressing upon the lung; or in cases of cavities filled with air at the surface of the lung, or deep-seated cavities and only separated from the surface of the chest by a dense solid tissue; or, where liquid and solid, are intimately mixed with lung tissue, as in catarrh, in œdema of the lungs, in pneumonia at its commencement or during its resolution; in phthisis; and in tuberculosis.

Diminished.

*Diminished resonance.*—In this resonance the note is short, high pitched, and more muffled. Resonance becomes more and more impaired, or less and less clear as the thickness of the solid material upon which percussion is performed is increased, and the resonance is then said to be obscure, dull, or toneless. It occurs in lungs in which the resonant materials have been diminished by disease, as in fibroid phthisis. The pulmonary sound, or resonance, may become muffled if there be air contained in a single large closed cavity, the walls of which are rough and vibrate very imperfectly, or in numerous small cavities with tense vibrating walls. Thus, liquid or solid exudations into the lungs; exudations, effusions, or old

adhesions, into the pleura; extreme distension of the lung with air; all tend to diminish resonant sound.

*Non-resonant sounds.*—All soft animal tissues and collections of fluid are non-resonant to percussion. Non-resonant sounds.

*Metallic sounds* are sounds of a peculiar resonance. They are two in number. 1. Amphoric resonance is a tone of voice superadded to the tympanitic sound, as occurs in pneumothorax and in phthisis with large pulmonary cavities. 2. Cracked-pot sound is produced by the escape of air through a chink or a hole. It is best illustrated by clasping the hands loosely together, and striking the back of one of them upon the knee. In order to produce this sound a partially closed cavity, communicating with the external air, should be enclosed between two solid opposing media; such as, when percussed, may press upon the cavity and allow the escape of air. Thus, cracked-pot sound is produced in phthisis where there is a small superficial cavity or a thin superficial layer of healthy lung surrounded by dense consolidated lung, or a cavity enclosed between pleuritic effusion and consolidated lung. Metallic sounds.  
Amphoric.  
  
Cracked-pot.

*Pulmonary resistance*—*The degree of resistance.*—The resistance produced on percussion varies in proportion to the compressibility of the part percussed; the solids and liquids are highly resistant, whereas those tissues which contain air are much less so. It is thus that we distinguish solids from liquids and from air-containing cavities. Thus resistance is increased in consolidation of the lung, in large pleuritic effusions, and in distension of the pleura with air. In these cases the elasticity of the parts is also diminished. Pulmonary resistance.

## AUSCULTATION.

Auscultation

In the healthy chest voice sounds and breathing sounds are audible on applying the ear or a stethoscope. The



auscultation of the surface of the chest is practised with reference to three kinds of sounds.—1. The voice as heard over the thorax. 2. The breathing sounds. 3. The sounds produced in the pleura.

Thoracic  
vocal sounds  
in health.

1. *Thoracic vocal sounds.*—*Vocal resonance in health* is a voice heard upon the surface of the chest when the patient is made to speak. It may be muffled or clear. The *clear* is usually heard over the large air tubes, and is called bronchophony. The *muffled* vocal resonance is heard over the pulmonary region, and is a voice indistinct and humming. It differs from the clear vocal resonance only in degree. The clear resonance is best heard behind in the upper part of the interscapular regions, and approaches more nearly in character to the tone of voice resembling one produced in the larynx and heard upon the surface of the chest. In the larynx the sound of voice passes upwards and downwards from the vocal cords to the inner surface of the trachea or to the windpipe, and may be heard at the bifurcation of the trachea. The progressive diminution of the size of the air-tubes as they go downwards and the rigidity of their walls lessen the force of these sounds; hence the resonance of voice heard over the surface of the chest is both weak and muffled. The pulmonary tissues are in themselves also capable of producing vocal resonance in their distended state, but are bad conductors of sound, and hence in them the vocal resonance is muffled. In cases where the bronchi are obstructed by mucus, pus, or exudation, the vocal resonance is considerably diminished. *Vocal resonance in disease.*—

Vocal sounds  
in disease.

*Vocal resonance* is increased, and is known as bronchophony. Whatever causes aid or increase the conducting power of the lung, increase its vocal resonance. Thus in cases of consolidation of the lung and its extensive excavations by phthisis, the conducting power of the lung is increased owing to the diminution of the quantity of air in the lung

and to the decrease of the number of the alveolar septa. A clear voice sound, such as is produced in the bronchus, is heard, and is called *bronchophony*. The consolidation may include simple collapse, hæmorrhagic infarction, and new growths. The cavities may be the result of phthisis, of dilatation of the bronchi, of œdema of the lungs, and of emphysema. A variety of bronchophony is known as *ægophony*, and resembles in tone the bleating of a goat. *Ægophony* is a shrill voice heard behind the chest and in the inter-scapular regions, and indicates a thin layer of fluid in the pleura or a superficial collapse of the lungs. Another vocal resonance, called *pectoriloquy*, is the transmission of the vocal resonance from the tunnel of the stethoscope to the ear of the observer. *Pectoriloquy* is a clear voice. It shows the existence of a cavity or a tumour in the lung, or consolidation or collapse of the lung.

Broncho-  
phony.

Ægophony.

Pectoriloquy.

2. *Physical conditions of the respiratory sounds.*—The respiratory sounds are two in number, and are known as *inspiration* and *expiration* sounds. These are produced by, 1, the transit of air in inspiration through the glottis into the trachea and bronchi below, and into the pharynx above. 2. The passage of air in expiration through the narrow mouths of the air vesicles and minute bronchi into the wide passages beyond. 3. When from disease the small bronchi and air cells are obliterated or occluded, and a large bronchus or cavity with unbroken walls only remains as the part producing sound, the air passing through the mouth of such a tube makes a clear definite sound called bronchial or cavernous breathing.

Breathing-  
sounds.

*Respiratory sounds in health.*—They are heard over any part of the healthy chest, and are most distinct where the chest walls are thinnest, and are known as respiratory murmur or breath sounds. That heard over the large air tubes, between the scapulæ, and in women under the clavicles, more especially the right, possesses a certain quality, and is

In health.

called *bronchial breathing*. The sound produced in the air cells or spongy structure of the lungs being called *vesicular breathing*. The respiratory sound in children is loud and puerile. This is due to the frequency and depth of their respirations, to the thinness of their chest-walls, and to the perfection of the membranous septa of their lungs.

Vesicular  
breathing.

*Vesicular breathing*.—This sound is heard where the breathing lung is in contact with the chest wall. In health the inspiratory sound is equal in duration to the inspiratory movement; the expiratory sound follows without any interval, and is only of one fourth or one third of the duration of the inspiratory sound, and is less loud. The respiratory sound (vesicular breathing) is louder and of longer duration, as the respirations become more hurried and deep. The expiratory sound is always equal in duration to expiratory movement, and whatever quickens and deepens the expiratory movement makes the vesicular sound longer and louder. In fat women and in adults when the breathing is quiet, the expiratory sound is quite inaudible. The vesicular breathing is loud in children, and is therefore called puerile respiration.

Bronchial  
breathing.

*Bronchial breathing* is often heard during health about the upper dorsal vertebræ. It is a special quality of sound, and may be imitated by blowing gently through a tube as if to whistle. Another kind of bronchial breathing is known as cavernous breathing, and this may also be simulated by blowing through a cup-shaped cavity with a chink at the opposite end. In bronchial breathing the expiration is always audible, although usually less loud than the inspiration. A variety known as tubular breathing is characterised by a very sharp, shrill sound heard through a very narrow tube. It is common in hepatized lung.

Respiratory  
sounds in  
disease.

*Respiratory sounds in disease*.—It is convenient for memory to have a tabular form of respiratory sounds in disease; a single example of the occurrence of each is given:

*Changes in breath sounds.*—1. Breathing sounds *simply absent* over a large effusion ; cancerous growths.

2. *Simply increased* (puerile breathing) in the unaffected lung in pneumonia.

3. *Bronchial breathing* in pneumonia, second stage.

4. *Cavernous breathing* in large cavity in phthisis.

*Additions to breath sounds.*—(a) *External :*

1. *Friction sound* in pleurisy, with effusion (not where large fluid effusion).

(b) *Internal :*

1. *Crepitant râle* in pneumonia, first stage.

2. *Sub-crepitant râle* in tuberculous lung.

3. *Large moist râle*,  
4. *Rhonchal* „ } all in bronchitis.  
5. *Sibilant* „ }

(c) *Voice sounds :*

1. *Bronchophony*, wherever bronchial breathing.

2. *Pectoriloquy*, a shrill bronchophony in cavity in phthisis.

3. *Egophony* in pleurisy (but not exclusively).

The respiratory sounds may be absent, weak, or loud. They are *simply absent* over a large effusion and in cancerous growths. *Weak respiration* implies a less than usual quantity of air entering the lungs ; it may be either due to an obstruction in the air passages or may be caused by whatever interferes with the movements of the chest walls. Loud inspiration indicates that obstruction is not in the air passages, but in some part of the lungs beyond, where the *loud respiration* is naturally heard. This occurs in cases of tubercles in the air cells. *Bronchial respiration* when heard over the chest indicates obliteration of the spongy portion or air cells of the lung. It may be from collapse of the air vesicles, or from exudation into them. Thus, pneumonia, phthisis, consolidation of the lungs from any cause, simple congestion, œdematous lung, the thicken-



ing of the bronchial tubes with condensed surrounding structure, all produce this effect. Very often destruction of the air vesicles, and formation of large cavities, as in phthisis; the dilatation of the bronchi from any cause; give rise to *cavernous breathing*. *Râles*.—These are additional abnormal sounds, and are heard within the chest during respiration. They are called râles, rhonchus, or rattle, and are of three kinds, namely, crepitant, mucous, and sonoro-sibilant. 1. Crepitant—It resembles the sound produced by rubbing a lock of hair between the fingers close to the ear. This râle is heard during inspiration, either all throughout or at its close. Best heard in cases of pneumonia, œdema of the lung, and collapse. 2. Mucous or moist râle—It is a sound produced by the passage of a current of air through liquids contained in the air passages. The air in its passage forms bubbles, which when small produce the sound called the crepitant râle; if the bubbles are extremely small the sound is then called subcrepitant; and when the bubbles are large it is called gurgling. 3. Sonoro-sibilant or dry râle.—These sounds are described as snoring, cooing, hissing, or whistling sounds, and are produced by the passage of air through dry and inflamed small and large bronchial tubes. The low-pitched sound being called sonorous, the high-pitched sibilus.

Amphoric  
sounds.

*Amphoric sounds* are of several kinds, and are produced by the passage of air into a large cavity surrounded by consolidated lung.

Amphoric  
echo.

1. *Amphoric echo* is a metallic resonance, and resembles the sound produced by blowing or speaking in a large empty glass bottle. In disease this sound shows the existence of a large cavity containing air. It may accompany the healthy respiratory sounds, the vocal resonance or râles. It may be heard while the patient is swallowing liquid, or after coughing.

2. *Metallic tinkling* resembles a sound heard by striking a metallic vessel with a pin, and is a single sound. It may attend respiratory sound, or may be heard during speaking or coughing. It is mostly alternate with respiration, and is constant with speaking and with coughing. It is limited to one side of the chest, and best heard at the apex, where also it is of a limited extent.

Metallic  
tinkling.

3. *Bell sound* is rarely heard. It is a clear ringing sound, and due to the passage of air in a large dry and empty cavity. It is heard on striking over the surface of a large air-containing cavity, while the assistant strikes the surface of the cavity by means of a hammer and a pleximeter or two coins.

Bell sound

3. The *pleural sounds* in disease are the friction sounds, and sounds produced in large cavities. *Friction sound* is in character a rubbing sound which accompanies respiratory movements. It varies from the slightest grazing to the harshest scraping. *In position*.—It is commonly heard over a small part of one side of the chest, below the axilla, or about the angle of the scapula. *In time*.—It may accompany expiration or inspiration or both, or may be only at the end of inspiration. It is unaccompanied by any unnatural respiratory or vocal sounds. Cough has no power in removing or modifying it. They are due to roughness of the pleura due to lymph exudation, or to miliary tubercles. May be heard in intertubular emphysema.

Pleural  
sounds.

*Splashing sounds* are due to a large cavity, and may be amphoric, but are far more often due to liquid and air contained in the pleural sac. They are heard when the patient is shaken, and by the patient himself as well as by the physician. These sounds are due to a large cavity with smooth walls.

Splashing  
sounds.

Amphoric echo and metallic tinkling occur in large phthisical cavities, and in pneumo-thorax. The bell sound is heard only in pneumo-thorax, and splashing sound

in hydropneumo-thorax, in large phthisical cavities, and in hydropneumo-pericardium. Sometimes a distended colon gives a succussion sound.

I have gone thus fully into the subject of the physical examination of the chest, because it is only by an accurate method of observation and the precise use of terms that certainty can be attained in the diagnosis of the diseases of the lungs. The best plan is for the physician or the student to have a definite formula for the physical examination of the chest in his mind, which he makes a rule always to follow. The time which he may sometimes appear to waste by rigidly adhering to this will be more than made up for by the superior accuracy which he will attain.

The following formula may be used :

<i>Inspection.</i>	{	Shape of chest ; Condition of mnsclcs ; Movements.
<i>Palpation.</i>	{	Confirm inspection ; Vocal vibration ; Observations of rarer phenomena, as fluctuation.
<i>Percussion.</i>	{	Determine areas of dulness ; Determine areas of resonance ; Resistance.
<i>Auscultation.</i>	{	Breathing sounds ; Voice sounds.

## DISEASES OF THE PARENCHYMA OF THE LUNGS.

### HYPERÆMIA OF THE LUNGS.

Hyperæmia  
of the lungs.

*Congestion of the lungs, or hyperæmia.*—It always co-exists with inflammation, and is chiefly serious because its presence increases the liability to inflammation. It may be active or passive. Simple hyperæmia is of most frequent

occurrence, and is often a serious complication of valvular disease of the heart.

*Causes.*—May be due to valvular disease of the heart; Causos. to irritants inhaled with the air, or to the presence of irritation in the lung substance; to the arterial capillary obstruction in one part of the lung causing hyperæmia in another part; to some obstruction in the minute bronchi preventing the entrance of inspired air, and causing rarification of the residual air, and thus diminishing the normal pressure from the vessels. It is also a frequent complication of fevers. When it occurs in old and debilitated persons and in low fevers, it is called *passive* congestion. Passive congestion. When seated chiefly in the dependent part of the lungs it is called *hypostatic* congestion. Hypostatic. Congestion, when secondary to heart disease, is general, and is often followed by hæmorrhage into the lungs, and is then known as *pulmonary* apoplexy. It is very often the first stage of inflammation or of pneumonia.

*Post-mortem appearances.*—The lung is enlarged and heavier than natural, of a deep red, livid, or blackish-red colour; a cut portion is easily lacerable, is moist, and crepitates imperfectly. On section frothy blood escapes, and its pieces float in water. Post-mortem appearances.

*Symptoms.* — 1. Gradual dyspnœa, varying with the degree of hyperæmia; 2, sensation of tightness or oppression across the chest; 3, cough, attended with expectoration; and, 4, more or less lividity and other asphyxial phenomena. Symptoms.

*Treatment* is that of local congestion; generally purgatives may be freely used, and in a few cases bleeding relieves the hyperæmia rapidly. Treatment.

### ŒDEMA OF THE LUNG.

Œdema of the lung.

It is the result of a long-continued or intense hyperæmia, is generally associated with cardiac disease, and may be a



**Causes.** part of general dropsy or of adynamic fever. Both lungs are usually affected. It occurs in the course of scarlet fever, and in Bright's disease. In pneumonic consolidation the lung surrounding it is usually œdematous. Sometimes œdema of the lung sets in as an acute condition in pulmonary catarrh. When this occurs in children, which is its commonest condition, it is almost always fatal. It is chiefly observed in the most dependent parts and in cases where the lungs are congested.

**Post-mortem appearances.** *Post-mortem appearances.*—On opening the chest the lungs do not collapse, but are voluminous, tense, heavy, pale, slightly pit on pressure, and the tissues are healthy and moist. On section red or colourless serum, frothy or otherwise, escapes in large quantity.

**Symptoms.** *Symptoms.*—The same as those of hyperæmia of the lung, but in this affection the cough is attended with very profuse watery expectoration; there is also dyspnœa, lividity of the surface and other symptoms of imperfect aëration.

**Physical signs.** *Physical signs.*—The chest is resonant, the breath sounds are healthy, and crepitations are generally audible behind or below.

**Treatment.** *Treatment.*—Sometimes the sudden dyspnœa has been relieved by the production of collateral œdema in a limb by means of Junot's boot.

Pneumonia.

## PNEUMONIA.

### INFLAMMATION OF THE LUNG TISSUE.

It is an inflammation of the substance of the lung, and is of two kinds, *croupous* and *catarrhal*, or lobar and lobular.

**Causes.** *Causes—Predisposing.*—Lobar pneumonia is uncommon in very young children, but, with this exception, it is often seen in patients of every age. It may occur as a simple morbid condition, or may coexist with some acute or

chronic disease. Thus, pneumonia is a common complication of acute rheumatism, of Bright's disease, of all the exanthemata, and of the low states of the system produced by drinking and by syphilis. The *exciting* cause is most often exposure to cold. Pneumonia may also be produced by the introduction of foreign bodies or poisonous substances into the lungs. Direct injury to the lung, whether by wounds or bruises, also causes pneumonia.

*Pathology.*—There are two varieties of acute inflammation of the lung—lobar or croupous, and lobular or catarrhal. *Lobar* most frequently affects the right lung; it begins at the root of the lung, spreads at first to the lower, and then extends to the upper lobes. In old and cachectic people the upper lobes are first involved. It sometimes affects the whole or only a part of the lobe, usually the base. There is also exudation of serum and of plastic lymph into the surrounding uninflamed air-cells and into the minute bronchi. It is also called croupous pneumonia. It is divided into three stages: 1, engorgement stage; 2, exudation stage or red hepatization; 3, purulent infiltration stage, or grey hepatization.

*Engorgement stage.*—The lung still contains air, is of a deep red colour, denser and heavier than in the natural state, the affected part is firmer, more resisting, and less elastic; it pits on pressure, and is slightly crepitating. On section red frothy serum escapes, which is more or less brown, and somewhat viscid, the lung texture is intact, and pieces of it float in water; the tissue is more easily torn. The elasticity and sponginess of the lung substance is diminished. The vesicles contain fluid and air. This is the stage of congestion and of proliferation, and the condition of the lung is equal to that in a state of hypostatic congestion.

*Exudation stage.*—The lung is consolidated. The air has disappeared from the vesicles, and the sacs are filled with coherent masses of cells, and small firm plugs of coagulated

fibrin and blood. The exudation often extends from the air cells into the extremities of the bronchi. The lung is completely solidified, is of a thick and heavy consistence, it varies in weight, which is considerably increased. On section no fluid escapes, and there is no froth; the cut portion is non-crepitant, and sinks in water, is easily lacerable, and breaking down under very slight digital pressure. The microscope reveals amorphous fibrin, abundant newly formed cells and granules. Later on the exudation degenerates, and breaks down into fluid; the epithelial cells are replaced by granule cells and by oil granules, and even pus cells, and the third stage is reached.

Purulent  
infiltration  
stage.

*Infiltration.*—This stage is sometimes spoken of as that of purulent infiltration. The infiltration, however, is merely a result of what occurred in the second stage. The fibrin then deposited has undergone fatty degeneration. Hence the lung, though still more or less consolidated, is no longer granular on section, but the cut surface is smooth, and bathed with purulent fluid. The red colour which often accompanies the second stage is rarely seen in the third. The lung is grey, and the terms grey hepatization and the purulent infiltration are synonymous. Instead of resolution, in this stage the lung may become the subject of gangrene or of abscess. These changes have the same phenomena in the lung as in any other part of the body, there is destruction of the lung substance itself, while in purulent infiltration a microscopic section shows that though the air cells are filled with purulent fluid their walls are altogether intact. Besides the rare terminations in gangrene and abscess, acute pneumonia may pass without an interval into chronic disease of the lung, and in this chronic inflammation tubercle is almost invariably a morbid product, in other words, the pneumonia goes on to phthisis. Some degree of accompanying pleurisy is present in most cases of pneumonia, and is shown post-mortem

by a local deposit of recent lymph. The right side of the heart is full of blood. There is stagnation of blood into the jugular veins, and into the sinuses of the brain. In the liver and in the kidneys the blood is coagulated or is liquid. The coagula are also seen entangled in the trabeculæ of the heart.

*Symptoms.*—Acute pneumonia may occur as a disease of Symptoms. itself or as a complication of other disorders, and its commencement is somewhat different in the two cases. In the first it begins by a single violent rigor, often accompanied by vomiting and violent pain in the affected side; very often there is an herpetic eruption in the first twenty-four hours. If, however, the pneumonia comes on in the course of acute rheumatism, Bright's disease, or scarlet fever, its commencement is marked by the addition of dyspnoea to the former symptoms, rather than by a well-marked rigor. There may be prostration, nausea, and vomiting, and diarrhoea, great cough; the breathing is accelerated, but not laboured; the skin is hot and perspiring or very dry; the tongue is furred; the urine scanty and albuminous. There are nervous symptoms, as headache and delirium at night. There is also pain in the affected side and there is distressed breathing. In some cases, after two or three days of illness, the temperature falls, the symptoms subside, and convalescence is established. In others convalescence is delayed for a week or for a fortnight. When death occurs it is due to asthenia or to gradual asphyxia, or to both combined.

*Characteristic symptoms of pneumonia.*—1. The initial Rigor. rigor is characteristic, is generally very severe, and is not repeated. 2. The temperature rises from the time of Temperature. invasion within a few hours, with the shivering, but is seldom above 106°. The temperature remains high, with morning remissions and evening exacerbations till convalescence, when it suddenly or gradually falls. The remissions in temperature vary from one half to two degrees. In fatal



cases the temperature rises rapidly before death, or there may be typhoid symptoms, with debility, dry tongue, or delirium, and often mistaken for typhus fever. 3. Herpes. Herpetetic eruptions appear about the lips and the alæ nasi. 4. The Skin. heat of skin is great, and it is also dry. Perspiration is often profuse; the face is flushed and somewhat livid in the early stage. 5. The Pulse. the pulse is full and strong, or full and dicrotous, at first; later on it becomes small, weak, and feeble. Pulse may rise from 100 to 150 or 160, and is Pain. feeble and irregular. 6. Pain. Very often there is pain in the side of a stabbing character, and increased on movements. 7. The Respiration. respirations are hurried and shallow, and increased to fifty or sixty in a minute. The ratio between the pulse and respiration, instead of being as normally four to one, sinks to two, or to one and a half, or to one. There is dyspnœa; the alæ nasi are dilated, and the respirations are very frequent. The inspiration is laborious, and the expiration is short and abrupt. 8. Cough. Cough is rarely absent, but causes so much pain that the patient instinctively does all in his power to prevent attacks of coughing. The result is that the cough becomes paroxysmal. It is short and hacking; is dry at first, but is soon attended with expectoration. 9. The Expectoration. expectoration in acute pneumonia is at first mucus, viscid and semi-transparent, and continues in this state while the lung is in the first stage. When the second stage is established the sputum becomes rusty coloured, and this variety of sputum is pathognomonic of acute pneumonia. As resolution goes on the liquefied fibrin gives origin to a muco-purulent expectoration. Thus, each stage may be said to have its characteristic sputum. Under the microscope the sputum presents blood-corpuscles, epithelium, mucus-cells, and oil-granules. 10. Digestive organs.—The tongue is thickly coated, and in some cases becomes dry and brown, and there are sordes about the teeth. Thirst is great, there is

loss of appetite, and sickness. Bowels are irregular. Urine is scanty, dark coloured, of high specific gravity; and it contains excess of urea and uric acid, and is deficient in chloride of sodium; it sometimes contains albumen. During convalescence it becomes abundant, pale, and of low specific gravity. The urea then diminishes, and chloride of sodium increases. 11. Nervous system. Violent frontal headache is characteristic of pneumonia. Delirium occurs very commonly at the beginning of the attack and while the temperature is high. In some cases delirium is first observed towards the crisis. The former description of delirium need excite no alarm, but the latter is a serious symptom. In very debilitated people and in drunkards the delirium of pneumonia may closely resemble that of delirium tremens.

Urine.

Nervous  
symptoms.

*Terminations.*—*In favourable cases* crisis sets in at the end of the first week. If the temperature be taken every hour it is found that the fall takes place within about twelve hours, in which period it is not uncommon for the thermometer to descend from  $104^{\circ}$  to  $97^{\circ}$ . Dyspnoea abates, face becomes pale, respiration and pulse sink to their natural standard, and convalescence is established; there is profuse perspiration, the patient sleeps, and often on awaking calls for food. The blood disappears from the sputa, which becomes yellowish from the admixture of mucus with fatty degenerated cells. *In unfavorable cases* the crisis does not occur at the end of the first week, and there may instead be only a short remission, after which the disease grows worse and spreads. This occurs during the second week. When the temperature remains high, the face becomes more livid, extreme prostration sets in, with weak and fluttering pulse, the respiration is gasping, and there are typhoid symptoms. There is delirium and stupor, followed by coma, with subsultus tendinum, tremulousness, and involuntary passage of urine and fæces, and death. Very often in such cases a change

Termina-  
tions.Favorable  
cases.Unfavorable  
cases.

occurs, followed by rapid convalescence. The sputa, which were watery and black, now change into yellow, owing to fatty degeneration, and other fatal symptoms also abate. When pneumonia is secondary, or supervenes in the course of fevers, or when it occurs in old persons, adynamic symptoms set in rapidly. In such cases there is no cough, no sputa, no pain in any part of the chest, and no dyspnœa. There is frequency of respiration and pulse, and great elevation of temperature. In such cases we have only to rely on the physical signs for diagnosis. In these cases inflammation extends from the bronchial tubes to the lobules, which either become collapsed or inflamed. In topers and intemperate persons pneumonia begins with an attack of delirium tremens, and in them also only physical examination reveals the disease, no other signs being detected.

Terminations.

*Terminations.*—We may have *complete recovery* by resolution or by crisis, which generally occurs by the end of the first week. A *relapse* sometimes occurs. *Death* takes place from asphyxia, more commonly from collapse or from exhaustion. Very often exudation remains unabsorbed and *chronic pneumonia* sets in, ending ultimately in a form of phthisis.

Physical examination.  
First stage.

*Physical examination.*—*First stage.*—*Inspection:* movements of the chest are deficient, partly on account of pain. *Palpation:* increased vocal fremitus. *Percussion:* abnormally clear resonance. *Auscultation:* healthy vesicular or breath sounds, or harsh and weak, and occasionally bronchial breathing. This bronchial sound is heard in minute spaces of bronchial terminations and air-vesicles, with minute crepitation (true crepitant rhonchus) during the whole of inspiration, rarely during expiration, and frequently only at the end of deep inspiration, such as precedes a cough.

Second stage.

*Second stage.*—*Inspection.*—Slight enlargement of the

affected side, the expansive movements are greatly impaired. *Palpation*.—Vocal fremitus is markedly increased. *Percussion*.—Dulness with increased resistance. *Auscultation*.—Tubular or bronchial breathing. Vocal fremitus is increased over the part where the lung is dense and solid; This is due to the entrance of a permeable bronchus in the condensed lung mass, and to the sound conveyed along the solid conducting medium. Absence of breath sounds. This may be due to the bronchi being filled with secretions. When the secretions are set free by a cough bronchial respiration is re-established; there is no fine crepitation, and no breath sounds. When the patient speaks vocal resonance will be increased, amounting to bronchophony. No organs are displaced. These signs persist during the stages of grey as well as red hepatization.

*Third stage*.—An abundant subcrepitant râle is heard Third stage. at first, in addition to the auscultatory phenomena of the second stage, and as the consolidation diminishes the râle increases. This râle is often spoken of as *crepitatio redux* or recurring crepitation, but the term is not a very accurate one, since the crepitation of the first stage and of the third are totally distinct sounds.

The *right lung* is more frequently attacked, and at the *base* pneumonia is sometimes double. When one lung is diseased the respiration becomes puerile in the healthy lung. Pneumonia very commonly accompanies inflammation of the pleura, and in such cases friction-sound may be audible, mixed up with the pneumonic sounds. The signs of pleuritic effusion may also obscure the signs of consolidation of the lungs.

*Diagnosis*. — Acute pneumonia may be distinguished Diagnosis. from *bronchitis* by the characteristic crepitation, or by dulness on percussion. From *phthisis* by the extensive area of dulness after a few days' illness. From *pleurisy* by



the intensification of vocal vibrations in pneumonia and their total absence in pleurisy. *Alcoholism* and pneumonia in debilitated persons give rise to symptoms so nearly alike that the pneumonia may be overlooked if a careful physical examination is not made in every such case. The extreme violence of the initial rigor in pneumonia, with its headache, delirium, and vomiting, have led to the suspicion of *meningitis* or some gastric disorders.

Prognosis.

*Prognosis.*—Pneumonia when both lungs are attacked, in drunkards, in little children, and in very old people, in patients with Bright's disease and with typhus fever, is extremely dangerous, and usually fatal. Cases in which only one lung is affected, and which occur in the course of acute rheumatism usually recover. Delirium at the time when the crisis ought to occur, and prune juice expectoration are bad signs.

Complications.

*Complications.*—Some degree of *pleurisy* occurs in almost every case of pneumonia, and there is, of course, a certain amount of *bronchitis*.

Sequelæ.

*Sequelæ.*—*Phthisis* is the only sequel to be dreaded.

Treatment.  
General.

*General treatment.*—The room of the patient must be well ventilated. There are three plans of treatment adopted, namely, *expectant*, *antiphlogistic*, and *stimulant*, and each varies with the stage of the disease. In the first form—the *expectant*: attempts must be made to remove the cause, to treat the symptoms, to watch the patient properly, and leave the rest of the cure to nature. Large poultices to the affected part, and ice bags, or compresses are valuable. In the second form *antiphlogistics* and vascular sedatives are employed, but they relieve dyspnœa and fever only for a time. Leeches may be tried as a palliative if the subject be vigorous, the case recently seen, the temperature not above 105°, and the pulse below 130. If there is œdema of the unaffected lung endangering life; if respiration is extremely hurried, between 40 and 50 in a

Expectant.

Antiphlogistic.

minute, and if the sputa be sanious, or if stupor or transient delirium sets in, antiphlogistics are injurious. In the third method *stimulants* in large doses are the most valuable aids, chiefly carbonate of ammonia. The main indications for stimulants are delirium; very rapid weak pulse; signs of prostration or collapse; the patient old, and the disease not primary. In all cases good nourishing diet should be administered at regular intervals. *Locally*: fomentations with or without anodynes, or with turpentine, or sinapisms to the chest are useful to relieve pain. In chronic cases where the fever has abated, and dyspnoea only continues, relief is obtained by a blister to the chest. For high fever warm baths or large doses of quinine may be tried. Should expectoration be profuse sedatives may be given. If very scanty alkalies are recommended, chiefly hydrochlorate of ammonia with balsams.

Stimulant.

Local.

## LOBULAR OR CATARRHAL PNEUMONIA.

Lobular pneumonia.

Definition.

The word catarrh applies strictly to inflammations of the mucous membranes, but as a mucous membrane has not been demonstrated in pulmonary vesicles the term is not strictly applicable, but for the sake of clearness it has been retained. It is an inflammation limited to single lobules scattered over the lung substance in patches, which presents the ordinary features of red or grey hepatization, and varies in size from a hempseed to an egg. It occurs in young children and in older persons. Very often these lobules coalesce and form a lobar variety.

*Pathology*.—There is no fibrinous exudation as in the croupous variety, but merely proliferation of the epithelial cells lining the alveoli and of granular cells. These cells undergo (1) liquefaction, and are reabsorbed or discharged; (2) sometimes they form abscesses or undergo cheesy degenerations leading to destruction of the lung tissue;

Pathology

(3) sometimes by a deposit cause tuberculosis of the lung ; or (4) may set up chronic interstitial pneumonia.

*Causes.*

*Causes.*—The disease may be acute or chronic. It is generally secondary to the disease which leads to the blocking up of minute bronchi, or may result from the extension of inflammation from minute bronchi to the air-cells, or from the entrance into the air-cells during inspiration of the inflammatory products of the tubes, which then irritate them to inflammation. It is often associated with collapsed lobules.

*Disseminated pneumonia.*

Closely related to lobular pneumonia is a variety of pneumonia known as *disseminated pneumonia*. This is due to the obstruction of small branches of the pulmonary artery by emboli or thrombi, or may occur in the course of pyæmia. In lobular pneumonia when it occurs it has a rapid tendency to run on to suppuration or even to gangrene, and is frequently the seat of hæmorrhage. In weak and elderly persons, in those suffering from acute or chronic diseases, or exposed to impure air, it is extremely common. It often occurs with measles, whooping-cough, or diphtheria. The disease is often limited to single lobules, and is therefore mistaken for lobular pneumonia.

*Post-mortem appearances.*

*Post-mortem appearances.*—The inflamed lobules are scattered through both lungs, being most abundant towards the bases and along their lower free border, and also towards the surface. They are firm and wedge-shaped, with the base outwards somewhat projecting beyond the surface, where each lobule forms the centre of pleural exudations. They are friable and break easily under the fingers. On section they are at first of a yellow colour ; later, when transudation increases, they are light or greyish. The surface is smooth ; pressure forces out opaque fluid, at first bloody and containing abundant cells subsequently mixed with pus and mucous corpuscles. The portion readily sinks in water in many cases. There is a tendency

to the development of bronchitis, and to the effusion into the small bronchial tubes of a viscid sanious fluid. The effusion undergoes coagulation, and thus forms casts in tubes of coagulated fibrin and of corpuscles. The dilated small bronchi are found to contain pus.

*Symptoms.*—The disease is often associated with, and is generally preceded by, inflammation of the smaller bronchi, with catarrhal bronchitis, or with pulmonary collapse. The symptoms are mere modifications of those of its originating disorder. A bronchial tube becomes obstructed, collapse of air vesicles beyond the obstruction takes place, and subsequently catarrhal pneumonia, with rapid cell formation in collapsed lobules, results. The disease is to be suspected if the child fears to cough, and with each cough there is pain in the chest; fever with high temperature is an important sign; the remissions and exacerbations are liable to recur after the temperature has become normal; the skin perspires freely; the pulse is frequent, feeble, and irregular; there is great dyspnoea; frequent breathing; short, hacking, painful cough, with diminished expectoration; there is great restlessness, and the child becomes somnolent. In adults it occurs in connection with pulmonary hæmorrhage and pyæmia.

Symptoms.

*Physical signs.*—They are exceedingly uncertain; there may be none whatever, or a few may be present in the parts corresponding to the consolidated portion. There may be a narrow strip of dulness on both sides of the spine.

Physical signs.

Progress is extremely acute, may end fatally in a few days; patient soon falls into an apathetic state, and symptoms of carbonic acid poisoning come on. Resolution is usually gradual, and protracted, may lead to permanent lung mischief.

*Diagnosis.*—The disease is preceded by bronchitis, a high temperature, affecting the left lung; and absence of a distinct chill, and of rusty expectoration, makes the diagnosis certain.

Diagnosis.



**Prognosis.** *Prognosis.*—Very unfavourable, rarely ends in chronic pneumonia.

**Treatment.** *Treatment.*—Emetics sometimes are serviceable to unload the lungs, sinapisms may be also necessary, abundant nourishment is required with stimulants in many cases.

### FIBROID PHTHISIS.

**Fibroid  
phthisis.  
Definition.**

*Fibroid Phthisis.*—Otherwise called chronic or interstitial pneumonia, or fibroid pneumonia, or cirrhosis of the lung. It is rarely primary. In this disease the connective tissue of the lung becomes increased and hardened, so that the lung is solid and hard, and when cut presents a smooth shining appearance and gives a creaking sound to the knife. It is a sequel of chronic bronchitis, and the gradual passage from chronic bronchitis into this disease is indicated by a gradual aggravation of the symptoms.

**Causes.** *Causes.*—The disease is rarely primary, it is the sequel of chronic bronchitis or of old pleurisy. It may be due to exposure to irritant gases or solids, as coal dust, millstone, copper ore, flax dust, and minerals and vegetables.

**Pathology.** *Pathology.*—Some believe it to be an inflammation of the interstitial tissues of the lung, just as in cirrhosis of the liver; others believe it to be not an inflammation, but a direct nucleated fibroid degeneration, which surrounds the bronchial tubes and vessels, and invests the walls of an alveoli, and then spreads through interlobular septa into the lungs, there is no free exudation in the air cells, or in the interstices of the tissues; the process is merely an hyperplasia of the connective tissue. The induration takes place by the development of nucleated fibroid tissue around the bronchi, or in the interlobular septa, or in the walls of the air cells, or in all these places at once. Its formation is at first soft and vascular, gradually it sinks and becomes callous and bloodless, and occupies a smaller space than the

healthy lung. The fibroid tissue finally reaches the whole organ, which is dense, hard, and airless. Besides this growth there is also an abundant deposit of pigment in the walls of air cells, and in connective tissues, and in the bronchial glands.

*Post-mortem appearances.*—The cirrhotic lung when cut is mottled. The lung is enlarged at first, but gradually becomes contracted and shrunk, its tissue hard and dense, does not break under the fingers, and creaks on being cut. On section the cut surface is smooth and dry, presents grey aspect, and fibrous bands are seen traversing the thickened bronchi or the blood vessels; the vesicles are destroyed, the larger bronchi dilated, and the fibrous growths here and there caseous. The smaller tubes are dilated in bulb at their ends, and they form cyst-like expansions, or open into cavities of larger size. Often the adventitious growth undergoes liquefaction, and thus forms vomica or several dilated tubes. The air cells become obliterated, retaining disintegrated epithelial cells, and emphysema is usually developed synchronously. The disease is limited usually to one lung. The pleura is usually thickened and adherent.

Post-mortem  
appearances.

*Symptoms.*—These are local and general. The disease is very chronic and may be prolonged for years, and symptoms generally relate to those conditions which complete the disorder. *Local.*—When a large portion of the lung is diseased there is progressive dyspnoea, due to the obstructed circulation in the nodulated lung. Dyspnoea increases on exertion, during winter, and with catarrh. There is dragging pain about the sides. Cough is attended with profuse muco-purulent or purulent expectoration with moulds of dilated bronchi, it may be foetid or black as in miners. There is hypertrophy and dilatation of the right side of the heart, and is followed by general anasarca. *General.*—Gradual loss of flesh and strength, impaired nutrition, night sweats, and signs of cyanosis. Pallor and

Symptoms.

lividity of the surface, and congestion of the nose, fingers, and toes. The pulse may be normal at first, but soon becomes rapid and irregular. There is more or less hectic fever with some elevation of temperature, there is loss of appetite, vomiting and diarrhœa.

Varieties.

*Varieties of cirrhosis.* *Red induration.*—Is an early condition of the disease. The lung is large-sized, red, and fleshy, denser than in health, and infiltrated with fibroid growth. It still contains air. *Brown induration.*—The capillaries are dilated and thick, the lung has a yellowish brown tint, and contains pigment matter of blood. It is a general accompaniment of heart disease. *Grey induration.*—Is an advanced stage of cirrhosis. Lung is grey and even translucent, and contains abundance of fibroid matter. *Black induration.*—Occur in cirrhosis in persons who work in mineral dust, and is generally fatal.

Complication.

*Complication.*—Bronchiectasis is thus explained. In this inflammation, part of the lung being diminished, the chest-wall, to fill up the space, gives way as far as it can, but its hard structure limits its power of contraction, and therefore the bronchus has to give way to atmospheric pressure.

Physical signs.

*Physical signs.*—*Inspection.*—The affected side is considerably retracted, and its movements impaired. *Percussion.*—There is marked resistance and absence of perfect resonance. *Auscultation.*—If not coughed for some time there will be suppression of or feeble breath sounds, sibilant sonorous and moist rales. After cough there will be a bronchial or cavernous breathing, and various rales in the dilated bronchi; if the cavity be deep there will be no physical signs. The heart is displaced towards the diseased side and the liver is drawn up.

Diagnosis.

*Diagnosis.*—It may be mistaken for tubercular phthisis. In *phthisis* the cavities are emptied with great difficulty, the sputa is foetid, and if left to stand it separates in three

layers, the upper frothy, the middle whitish-grey, and the lower one a sediment of a greenish-grey colour; cough comes up in violent paroxysms and at wide intervals. From *bronchiectasis* in this there is no fever, the secondary disease of the larynx and of intestines is very rare, and emphysema is very common.

*Prognosis.*—Death takes place by asthenia or by apnoea. Apnoea or suffocation may follow hæmorrhage, rupture of a large vomica, pulmonary œdema, or hydrothorax, or excessive bronchorrhœa beyond the power of expectoration. Prognosis.

*Treatment.*—Remove the cause. Attend to hygiene. Prevent complications, and improve health. Nourishing diet and tonics are necessary. Our object ought to be to promote absorption. For this purpose iodide of potassium is recommended. Attend to emptying of the cavities, and try to limit the secretions. Cough and expectoration demand opiates and expectorants. Patient must be cautioned against exertion. Change of air, cod-liver oil, and tonics are essential. Treatment.

### GANGRENE OF THE LUNG.

Gangrene of the lung is a condition where the lung is necrosed. In it the lung diseases reach their culminating period. It may follow lung abscesses as sequel of pneumonia or disintegration in consequence of hæmorrhagic infarction. Occurs in cases of pneumonia; by the food or any irritant getting into the air passages; or by an embolus obstructing one or more of the nutrient vessels of the lung; or in blood poisoning; and in chronic softening of the brain, by cutting off the nutrition of the lungs. Gangrene of the lung.  
Definition.

*Post-mortem appearances.*—Gangrene may be circumscribed or diffused. It may vary in size from a small nut to a considerable portion of the lobe; the lower lobes and the superficial parts are chiefly affected. In isolated parts the lung tissue is changed into a bluish-green colour, is moist, Post-mortem appearances.



and foetid, is abruptly limited, and is surrounded by œdematous lung tissue. At first the gangrenous spot is tolerably firm, but soon decomposes into a thickish, dark liquid, mixed with rotten *débris*. The liquid slough may discharge through a bronchus; it rarely empties into the pleural cavity or into the surrounding cellular tissue. In some cases the gangrenous portion of the lung is expelled, and a fibrous capsule forms, with a cavity containing healthy pus, and which may ultimately close up and cicatrise. In the diffuse form the entire lobe of the lung is gangrenous, its parenchyma is decomposed, and is converted into a pulpy, black, moist substance; it does not present any line of demarcation, as in the limited variety, but merges into the surrounding hepatized and œdematous lung tissue.

Symptoms.

*Symptoms.*—It cannot be detected during life. When it does occur there is cough attended with foetid expectoration, and the sputa contains gangrenous sloughs of the tissue of the lung. The patient soon becomes prostrated.

Treatment.

*Treatment.*—Very little can be hoped for. Patients generally die.

### PHTHISIS.

Phthisis.  
Definition.

*Phthisis* literally means wasting, but it has come to be applied to the forms of wasting due to diseases of the lungs, and especially to those diseases of the lungs produced by a new growth called tubercle. Two well-marked varieties are observed, and although the latter varies very much in duration, they may be conveniently denominated acute and chronic tuberculosis.

### ACUTE TUBERCULOSIS.

Acute  
tuberculosis.

*Acute tuberculosis* is a disease in which tubercle is rapidly deposited in the lungs and elsewhere, causing death before suppuration is set up.

*Causes.*—Two theories have been invented to account Causes. for the appearance of tubercles in the lung. The school of Laennec maintain the diathesis is the sole cause of tubercle, while the school of Niemeyer believed tubercle to be a mere product of inflammation—

Grammatici certant et adhuc sub judice lis est.

A tendency to tubercle is undoubtedly hereditary. Acute tuberculosis often occurs in children, and oftener before the middle of life than after it. It sometimes sets in after acute diseases, though the chronic or suppurative form is more common.

*Morbid anatomy.*—The body after death from acute tuberculosis is usually somewhat wasted. The lungs are found stuffed with minute tubercles, and the same growths are found on the peritoneum, pericardium, and sometimes meninges; one of these growths, if examined with the naked eye, appears merely a greyish translucent mass of the size of a small pin's head. When placed under the microscope it is found to be situated in the lymphatic tissue of the lung. At its earliest stage it consists of an aggregation of lymphatic cells each with a single nucleus, but very soon other cells, less numerous but larger and each containing two or three nuclei, appear, and with them a few very large cells with eighteen or twenty nuclei, these last are called giant cells. After a time the contents of all three kinds of cells undergo a degeneration. The tubercle then loses its semi-transparent appearance and becomes opaque. Under the microscope it now exhibits a mere granular appearance. The temperature having been high the spleen is usually enlarged. Sometimes the lymphatic glands, whether of the bronchi or of the mesentery, are caseous, to which the appearances already described under tubercular meningitis may in a few cases be added. Such are the post-mortem appearances of acute tuberculosis. Morbid anatomy.

Symptoms.

*Symptoms.*—Tuberculosis may occur in one of three forms :—1. Insidious. 2. Acute febrile. 3. Adynamic.

1. The insidious, in it the patient at first complains of languor, restlessness, derangement of digestive organs, offensive stools, with rapid wasting, and fever. With these symptoms the tubercles begin to appear.

2. The acute febrile is known by repeated rigors (without malaria), high fever, and head symptoms. The skin is pungently hot and temperature is also high.

3. The adynamic fever is associated with profuse sweating, great prostration, typhoid symptoms, and hurried respiration, &c.

In children.

In all these forms tubercles are noticed in certain structures, as the lungs, peritoneum, meninges. The patient is usually tall, slim, and erect, delicate looking, of a clear complexion, with large pupils, bright eyes; is precocious, clever in talking, and learns to walk soon; is very excitable and active in mind and body; the skin is thin and delicate, the veins easily perceptible, hairs fair and silky, eyelashes long. The ends of bone small and thick, shafts rigid and thin, cartilages soft and flexible, thorax small and flattened. When tuberculosis occurs in adults the symptoms are dyspepsia; difficulty in digesting sugar and fat; body pale; extremities cold; burning of palms of hands and soles of feet; temperature elevated; face puffy; enlargement of glands in the neck; feet and axilla covered with sweats of a disagreeable odour; pulse feeble and rapid; progressive loss of weight; and frequent attacks of fever; signs of disease in the organs invaded. The greatest liability is between eighteen and forty. The general course of acute tuberculosis is that of a febrile disorder, and it is not unfrequently mistaken for typhoid fever. The patient lies on his back in bed, with a quick pulse, high temperature, and rapid respiration. He often passes stools in bed, and very often retains his urine till it has to be drawn

In adults.

off with a catheter; cough is not usually present, and if it is there is no expectoration. Sometimes old and large lymphatics may be felt through the abdominal wall. The skin is usually extremely dry, but there may be abundant sweats. The quickness of the respiration is out of proportion to the rapidity of the pulse. There is rapid wasting, and the disease rarely lasts beyond the eighth week.

*Physical signs.*—The dyspnœa is often great, but on listening to the chest few physical signs are found to account for it. A few rhonchal râles are usually all that is to be heard. Physical signs.

*Diagnosis.*—Acute tuberculosis has been mistaken for typhus, typhoid, and intermittent fever, for insanity and for drunkenness. The absence of rash will distinguish it from *typhus*. The absence of rose-coloured spots, the flatness of the abdomen, the absence of abdominal tenderness, and the constipation which usually accompanies it, will distinguish it from *typhoid*. The absence of successive stages and complete intervals exclude *intermittent*. However, attention may be attracted by the delirium; the dyspnœa ought to prevent any case from being mistaken for one of *insanity*, while the persistence of the disease, of course, excludes *drunkenness*. Diagnosis.  
Typhus  
Typhoid.  
Intermittent.  
Insanity.  
Drunkenness.

*Prognosis.*—All cases terminate fatally. Prognosis.

*Treatment.*—Nothing can be done for acute tuberculosis. The patient must be kept in bed, kept warm and clean, his urine drawn off if necessary, and must be properly fed. Treatment.

## CHRONIC TUBERCULOSIS.

*Chronic tuberculosis.*—The second form of phthisis may briefly be defined as that in which suppuration of the lung takes place, and in which, therefore, there is cough with purulent expectoration. Chronic tuberculosis.  
Definition.

*Causes.*—The controverted points which have been Causes.



alluded to as to cause under acute tuberculosis, of course, apply also to the chronic form. It is markedly hereditary, and the statistics of the London and South of England districts show that it is most common in England where the rainfall is greatest, and the same has been proved of India and the United States. In Ireland it is unknown. There is no doubt that drink and dissipation tend to develop phthisis, and that acute diseases, such as smallpox, may develop any latent tendency to it. Persons moving from a warm climate to a cold are liable to be phthisical, and the same is true of monkeys, many of which die of phthisis in the Zoological Gardens of London. Phthisis in some countries is believed to be infectious, but there is no ground for the belief.

Pathology.

*Pathology.*—Whatever the primary cause of the deposit of tubercle, its results are easily observed. The cell-contents of the tubercles undergo degeneration, and at the same time a general irritation of the surrounding tissue is set up. This irritation goes on to ulceration, and the lung tissue is destroyed and coughed up. Thus cavities are formed, and may increase to any extent. These cavities present large ulcerated surfaces, and death is often the result of the exhaustion produced by their continued discharge. Less often it is caused by rupture of the diseased vessel or by extension of the ulceration till the pleura is perforated. In most cases the pleura is greatly thickened, and its surfaces adherent from the pulmonary irritation. After these changes have gone on for some time tubercles may invade other organs of the body and give rise to ulceration of the larynx or of the intestines or of the urinary tract.

Morbid  
anatomy.

*Morbid anatomy.*—The body of a patient who has died of phthisis is greatly emaciated. The skin is usually dry and brawny, and there may be œdema of the legs or swelling of an arm, due to thrombosis. There is little

subcutaneous fat, and the muscles are themselves wasted. The condition of the lungs presents numerous varieties of degree. The disease is most common and extensive at the apices of the lung, next at the upper lobe, and lastly at the lower lobe. It is often seen in various stages, often retrograded in one part, while extended at another. Generally both lungs are implicated, but it may be limited to one lung. There is always consolidation of some kind. In slight cases it may be limited to the lobules, and then extend to other parts of the lung. The affected part is yellow and soft, and small yellowish nodules are seen here and there. In cases of discrete tubercles the lung presents numerous patches of cicatricial tissues of a stellate form, with surrounding emphysema of the lung; occasionally in the centre of the scars minute concretions may be recognised. In cases of groups we find extensive tracts of consolidations of tissues around, often studded with caseous masses and black pigments, also cirrhotic contractions with more or less emphysema in their immediate neighbourhood. The cavities if formed are contracted and lined by a smooth membrane, and are continuous with the bronchial tubes. In rare cases the cavities are obliterated. The disease commences at the apex of the lower lobe, and spreads gradually downwards. The vomicæ originate in the upper part of the lungs; they commence with liquefaction of masses which surround the bronchi. A cavity once formed increases rapidly, and even assumes gigantic proportions. The vomicæ are often crossed by bands of condensed tissue, comprising vessels of large size. They are ragged in their interior, contain foetid fluid, and the tissues around them are more or less indurated. The tubercles undergo changes, and may become converted into a calcareous inert mass encapsuled in a dense fibroid envelope. Thus the affected lung is diminished in size and the healthy tissue in its neighbourhood compensatorily

expanded. The vomicæ may sometimes open directly into the various bronchi, into the pleura, or very rarely through the diaphragm into the abdomen. Besides these conditions of the lungs we also find in them ulcerations of the mucous membrane, dilated bronchi, emphysematous patches, pulmonary collapse, extravasation of blood, pneumonia, and pleuritic adhesions at the apices of the lungs.

Symptoms.  
Five  
varieties of  
invasion.

*Symptoms.*—Phthisis may begin in several ways—1, an attack of hæmoptysis ; 2, with general debility, accompanied in women by amenorrhœa ; 3, after an acute disease, as small pox ; and, 4, after lung disease of any kind ; 5, in the course of a chronic disease, as syphilis. The symptoms include those due to tuberculosis of other organs and of complications which generally supervene in the course of phthisis, viz. inflammation of the lungs and pleuræ, tubercular peritonitis, tubercular ulceration of the intestine, and fatty and lardaceous degeneration of various organs, and tubercular meningitis. The chief symptoms are referrible to the affections of the respiratory organs. In some cases the attack is insidious ; the patient is dyspeptic, the digestion faulty, and has aversion for all forms of fatty food ; this is soon followed by cough, dry and severe, at night or early morning, and followed by clear sticky expectoration, or streaked with blood. Or the patient without any obvious cause becomes weak and thin, suffers from slight attacks of fever ; or after exposure to cold gets a dry irritating cough ; or may, in the first instance, suffer from laryngitis, which slowly increases ; or may have a sudden attack of hæmoptysis, on the subsidence of which chest symptoms appear ; or after fever or pneumonia, or after some wasting disease, may suffer from cough, and phthisis then replaces the primary disorder. In well-established cases we have cough, with more or less abundant mucopurulent expectoration, and occasionally stained with or

accompanied by large quantities of blood; hectic fever, with periodic exacerbations, profuse sweats, rapid emaciation, and debility soon follow. Physical signs are those of progressive destruction of the lung substance.

*Symptoms in detail.*—1. Pain. There is a dull aching feel between the shoulders or below the clavicles. The pain in the chest may be a pleuritic complication or on account of cough; it is not always constant; is increased by movements, coughing, by deep inspiration, exertion, or by walking quickly. 2. The cough is dry and hacking at first. When the throat or larynx is affected the voice is generally hoarse. The cough is worse after meals and while going to bed, and at early mornings, and is often followed by vomiting. It is attended with expectoration, which is chiefly due to bronchial catarrh. The expectoration is at first clear mucus, subsequently, by breaking down of pulmonary tissue, it becomes muco-purulent, and where cavities are formed, the sputa become opaque, greenish-yellow masses, not frothy, sink in water, are nummulated and foetid; such expectoration is due partly to bronchitis, and partly to tubercular vomicae. Even with tubercles the expectoration is often mixed with more or less bronchial mucus. In some cases the expectoration is pure pus, of an unpleasant odour. In some it is scanty, and in others it is absent altogether. Under microscope it reveals caseous or calcareous particles, epithelium, abundant granules and pus-cells, blood-corpuscles, fat and oil globules, and in some cases fragments of lung tissue. In some cases cough is scarcely a matter of complaint from beginning to end, it increases in winter or cold weather and subsides in summer. In a majority of cases it is a cause of great distress. 3. Dyspnoea is common, but not necessarily so. It is severe if the larynx be also involved, if the bronchial tubes are full of secretion, or if there be pleuritic effusion. Generally, however, the respirations are frequent, but the breathing is not

Symptoms in detail.

Cough.

Dyspnoea.



troublesome; when dyspnoea is present it increases towards evening, and also on any exertion. 4. Hæmoptysis occurs at some period or other. Sometimes it is the first indication of disease; but it may occur at any time during the course of phthisis. It varies in quantity from a mere streak in the sputa to a quantity sufficient to cause death by choking or syncope. Hæmoptysis may be brought on by violent cough, or may occur without such violence at regular intervals. It generally comes from pulmonary vessels, which may be in a state of fatty degeneration, and by their rupture give rise to hæmorrhage. 5. Febrile phenomena.—In the more acute cases the fever is high, commences very early, and is generally continuous throughout the disease, and shows the nature of the destructive process. The fever has daily remissions and exacerbations. There is a difference between the morning and the evening temperature. The morning temperature may be normal, while the evening rises from  $1\frac{1}{2}^{\circ}$  to  $2^{\circ}$ . The temperature also rises after meals. The maximum temperature is  $104^{\circ}$  or  $105^{\circ}$ . In advanced cases the fever assumes a hectic form. During the exacerbation there is burning heat in palms and soles, and flushings of cheeks. The fever symptoms are the same as in other chronic diseases, and are attended with emaciation and debility. In the early stage the pulse is frequent and hard; in later stages the frequency still increases, but it becomes soft and feeble. With feebleness of circulation there may be hypertrophy, with dilatation of the right side of the heart and general anasarca. As a rule the heart is atrophied. 6. Night sweats are common in all varieties, they come on generally towards morning, and while the patient is asleep; when excessive they cause great distress and exhaustion. 7. Emaciation and debility both follow fever, faulty digestion, and sweats. Under judicious management patients often gain flesh for a time in this disease. The emaciation is more marked about the body

Hæmoptysis.

Fever.

Night sweats

Debility.

and limbs than the face, and most about the chest. The muscles are flabby, the muscular irritability is much increased, the patient looks anæmic, and there may be œdema of the legs, owing to the thrombosis of the iliac veins. The blood gradually becomes deteriorated in quality. The feeble circulation often affects the nose, ears, fingers, and toes, and they become congested, livid, and tumid, and thus clubbed form of fingers and toes results. In advanced cases the skin becomes dry and scaly, and also thin and white; bed-sores form. There is falling off of the hairs generally, with bulbous finger ends and incurved or cracked nails. The patient complains of absolute helplessness and exhaustion. 8. Digestion is deranged; dyspepsia is common, with signs of subacute gastritis. Appetite is often voracious; being sometimes capricious, and sometimes totally absent. The tongue is clean throughout; is often red, more or less furred, and even dry, glazed, and fissured. Towards the fatal termination, often aphthæ are formed (thrush). The urine is sometimes albuminous. In the early stage there is constipation, but later on obstinate and profuse diarrhœa sets in. Persistent diarrhœa is most serious, and is due to coincident ulceration of the bowels; may also be due to simple dyspepsia or to intestinal catarrh. The patient often suffers from fistula in ano. 9. The patients are generally hopeful, and imagine they will recover; but may be irritable or desponding. 10. The uterine functions are usually disturbed. 11. During the progress the patient suffers from degeneration of other organs. The liver becomes large and infiltrated, with amyloid or fatty matter, and the kidneys are subject to the same degenerations.

Digestion.

Mental  
derangement.

The *physical signs* of phthisis may vary with the stage of the disease, and though the line of demarcation between the stages is not so well marked as in pneumonia, three degrees of affection of the lung may be defined with

Physical  
signs.

First stage	tolerable clearness. <i>First stage</i> .—During which the tubercles are developed in the lungs, and they may be discrete or numerous. The tubercles in this stage may exist in the lungs, and may even be numerous without causing any definite physical signs. Generally, however, we find over the apices of the lungs or at one apex signs resembling those of bronchitis, except in the fact that they are localised and not general. The chest usually exhibits the alar or flat subtypical forms. Its transverse diameter is half as
Inspection.	long as its antero-posterior. There is on inspection diminished movement during respiration. When the tubercles are numerous the infra- and supra-clavicular regions are found flattened, and expansive movements of the upper and
Palpation.	front part of the affected side are defective. On palpation
Percussion.	vocal fremitus may be more marked. <i>Percussion</i> note will be dull in supra-clavicular and supra-spinous regions and wanting in elasticity; or over-resonant if the deposit extend to the trachea or large bronchi. The area of percussion sound is diminished towards the neck, shows that the apex
Auscultation.	of the lung is drawn down. <i>Auscultation</i> .—The inspiration will be harsh, feeble, or jerking, or dry clicking; expiration will be prolonged, owing to the impaired elasticity of the lungs. When the growth becomes more marked and sets up more pulmonary irritation, there is localised subcrepitant râle, or there will be in addition bronchial or tubular breathing and bronchophony. In delicate persons the persistent presence at the apex of the lung of a few clicking sounds, of a few rhonchi or crepitations, or of jerking respirations without obvious signs of consolidation, is of serious import. A distinct anæmic systolic murmur may be heard beneath the clavicles, and more under the right clavicle. Localised pleuritic friction sound is often
Second stage.	observed. In the <i>second stage</i> the tubercles begin to soften and disintegrate and form cavities. <i>Inspection</i> .—There is
Inspection.	marked depression or flattening of infra- and supra-

clavicular regions; the affected side is often contracted, owing to the softening and destruction of the lung tissue, leaving cavities, and there is defective movement. *Percussion* note is completely dull, owing to the layer of the lung forming cavity being usually thick and solid, but may be normal if the tubercles be few and well surrounded by an emphysematous lung. On *auscultation*, large, moist crepitation is heard in the diseased portion, and puerile breathing in the unaffected lung. *Third stage*.—Of cavities, in this stage the softened tubercles are eliminated. On *inspection* there is well-marked depression below the clavicles; whole of the affected side is flattened and contracted; intercostal spaces very much contracted; impulse of the heart may be seen and felt at a higher point than natural. *Percussion* affords a dull sound, owing to the layer of lung forming the wall of the cavity being dense and solid, or a cracked-pot sound where there is a free communication with the open bronchi and mouth, a rise in pitch on opening the mouth is a characteristic sign of a cavity. *Auscultation* elicits a gurgling sound should the cavity be dry and hollow; also breath sounds, varying from a tubular to a cavernous or amphoric respiration. The vocal resonance indicates bronchophony or well-marked pectoriloquy. In addition we often find moist râles at the apices, metallic or ringing rhonchi, and sometimes increased vocal resonance.

*Complications*.—(1) Ulceration of the larynx and trachea; (2) inflammation of the bronchi, pleura, and lungs; (3) tubercles in the peritoneum, ulcerations and tubercles in the intestines and mesentery, tubercles and degeneration of the liver, spleen, and kidneys, tubercles in the brain; (4) various forms of kidney disease; (5) general amyloid disease, and dilated bronchi; (6) emphysematous patches, pulmonary collapse, extravasation of blood in the lung; and (7) insanity, are the chief complications of phthisis. In many cases the



disease progresses from bad to worse, but more commonly there are remissions and exacerbations.

Terminations.

*Terminations.*—Some cases remain apparently in the same state for a long time, while others improve and may appear cured. Such cases remain amazingly inactive for a very long time in a moribund state. Death is due to asthenia and is generally slow; is sometimes rapid, and is referrible to profuse diarrhoea or to sudden and severe hæmoptysis. In some cases death is due in part or wholly to asphyxia; in them phthisis is associated with laryngeal disease, or much secretion in the bronchi, or with sudden effusion of blood into the air passages.

Prognosis.

*Prognosis.*—At an early period a hopeful opinion may be proclaimed, but when cavities appear it is very unfavorable. If the cavity be small and confined to the apex recovery may take place; but disease affecting the base is very serious. Where the disease is active, and progresses rapidly, it is very unfavorable; but if chronic and slow, and limited to the consolidation and induration of the lung, it is favorable. When due to bronchial catarrh, or to causes which could be removed, the chances of recovery are great. If there are evidences of scrofula or tubercular diathesis, or if the patient is feeble or delicate, it is more dangerous. Continued dyspnœa, harassing cough, profuse expectoration, and severe hæmoptysis, are dangerous signs; so also are high fever, frequent and feeble pulse, incapacity for work, emaciation without any obvious cause, and night sweats. If the fever ceases, and the patient gains in weight and flesh, it shows improvement. Improper food, unfavorable hygienic conditions, or derangements of the digestive organs, greatly increase the evil. In phthisis the appearance of thrush is a sign of approaching dissolution. The disease is delayed for a time during pregnancy, but after delivery it advances with great rapidity.

*Treatment.*—Our chief aim is to maintain and promote Treatment. the state of general health by attention to the quantity and quality of food, by recommending residence in a healthy climate, exercise in the open air, warm clothing next the skin, and sea baths. Foul and irritating vapours, or gases, or atmosphere, or irritating solids, as of mines, should be avoided and attention must be paid to all hygienic laws. The fever must be relieved by appropriate treatment, the diet must be most nutritious, animal diet being absolutely necessary. Too long an interval should not elapse between each meal, and food should be taken in small quantities and frequently. Where the complaint is acute, and of an inflammatory character, rest in bed, to preserve the patient's strength, and treatment for the different symptoms, may be had recourse to; anything which excites irritation of the lungs should be strictly avoided. All remedies to improve the general state of health and blood are serviceable. Among the special agents recommended for phthisis is cod-liver oil, of which a small dose (a teaspoonful) should be given at first and not too often repeated; the dose being gradually increased to a table-spoonful. It is best taken immediately after meals. It may be given with wine or milk, or brandy and water, or with beer; a good pale oil answers best. Regularity and persistence in the use of this remedy will be amply repaid. If it disagrees with the stomach it may be temporarily omitted, chiefly during the hot season. Other special remedies are, pancreatic emulsions, hypophosphites of lime, soda and iron, arsenic, and sulphuric acid; locally, to relieve the pain and to subdue the inflammation, flying blisters or irritating liniments, and even poultices are required.

*Treatment of urgent symptoms.*—High fever must be Treatment of  
urgent  
symptoms. subdued by sedatives which act upon the heart; for bodily exhaustion stimulants must be employed; night sweats

may be subdued by small doses of oxide of zinc, or tincture of belladonna, or astringents ; or by hypophosphite of lime or by injections of atropine ; the pain in the side can invariably be relieved by strapping, as in pleurisy ; cough may be managed according to the amount of expectoration, which may be encouraged or diminished as the case requires. If the cough be harassing it is advisable to look to the throat and larynx, and if there be any local cause it must be removed. If the cough is irritable anodynes internally and other medicated inhalations, as hops, are serviceable. If the expectoration be foetid disinfectant inhalations are good. Hæmoptysis, vomiting, and diarrhœa must be treated on ordinary principles. Change of air is an important element. It should be to a dry and elevated place ; it must be resorted to in the early stages, and in mild cases. Circumstances which render change of air unadvisable are : persistence of diarrhœa, increased debility, derangement of the digestive organs, and fever.

Cancer of the  
lungs.

### CANCER OF THE LUNGS.

The causes are unknown. Usually medullary. Encephaloid cancer of the lung is sometimes secondary to cancer of the breast, sometimes an accompaniment of the cancer of the liver, and rarely a primary affection. Medullary originates from bronchial glands, and then one or both lungs may be attacked, the right one more than the left. It generally occurs as an infiltration. It is extremely soft, pulpy, and vascular.

Symptoms.

*Symptoms.*—There are no characteristic symptoms. Probably cancer of the breast has pre-existed. There is dyspnœa on exertion, pain in the chest, accompanied with tenderness, emaciation, night sweats, cough, with purulent expectoration often resembling black-currant jelly, and

also containing cancer elements. Hæmoptysis is very common.

*Post-mortem appearances.*—Secondary cancer is generally nodular, while primary cancer more often infiltrates the lung. After a time it undergoes fatty degeneration and softening, and cavities are formed in the lung. It is associated with extensive pleuritic adhesions.

Post-mortem  
appearances.

*Physical signs* are the same as of tubercles coalesced. When the disease is primary there is flattening of the affected side, impaired movement, and dulness on percussion. In cases of nodular cancer there is an enlargement of the affected side, the surface feeling unusually even; there is absence of movement, absolute dulness, and great resistance, absence of breath sounds, and deficient vocal resonance. They have a tendency to softening and to undergo destructive inflammatory changes, ending in suppuration or gangrene. Death occurs from asphyxia, or from asthenia, from exhaustion or hæmorrhage, or from suppuration or gangrene.

Physical  
signs.

*Treatment.*—Palliative. Relieve the symptoms as they arise. Support the patient's strength by nourishing diet and stimulants. The disease is always fatal.

Treatment.

## EMPHYSEMA OF THE LUNGS.

Emphysema  
of the lungs.

*Definition.*—Emphysema is a disease of the lungs in which the air vesicles are dilated and the alveolar septa to a greater or less extent destroyed. The disease is generally progressive and chronic.

Definition.

*Causes.*—Its cause is uncertain. Too long inspiration, forced expiration, rigid primary enlargement of the chest walls, and nutritive derangements of the lung substance, are the hypotheses in vogue to account for its occurrence.

Causes.

*Varieties.*—There are two varieties—local or secondary

Varieties.



and general or primary. *Local emphysema* is an emphysema affecting a small portion of one or both lungs. It occurs near where a portion of the lung has been wasted or cut off from air supply. It therefore follows pneumonia, pleurisy, or chronic pulmonary catarrh. The first and the last sometimes cause the occlusion of a small piece of the lung substance from the action of the air. In pleurisy firm adhesions may prevent the expansion of some piece of the lung. In each case it is the part of the lung near the occluded or bound-down portions that becomes emphysematous. *General* or primary emphysema begins without any preceding circumstance except bronchitis, and begins most often in middle life. A predisposition to it is sometimes congenital, or it may occur in childhood after a severe attack of whooping-cough. In both varieties the nature of the morbid changes in the lung is the same.

Morbid  
appearances.

*Morbid appearances.*—In the general variety the chest is rounded. When the sternum is removed the lungs are not retracted, they seem bursting out of the chest, and sometimes completely cover the pericardium. The lungs, when removed, are soft to the touch and feel as if they had lost substance. The air vesicles are seen to be enlarged. The tissue is dry. If the emphysema be extreme huge hollow spaces are traversed by thin bands and the remains of septa are found. In local emphysema small patches of dilated vesicles are found. These are most frequent at the apex. These inflated patches may be distinguished from parts of lung into which air has been infiltrated, by the fact that by pressure extravasated air may be made to change its place, while the true emphysema is immovable. Morbid appearances, due to the physical results of emphysema, may occur. Of these dilated right heart with its results is the chief. The liver, spleen, kidneys, and venous system may be gorged with blood.

Symptoms.

*Symptoms.*—It is not till emphysema is considerably

advanced that its symptoms are prominent. They are the effects of the loss of elasticity and rupture of the air vesicles. Dyspnœa, increased on exertion, is short at first, but ultimately becomes permanent; it is often relieved by pressing the side or lying on the abdomen, becomes worse after a meal, or if fresh bronchitis, or asthma, or even dyspepsia sets in. Owing to obstruction to the pulmonary vessels and to imperfect aëration, the right side of the heart becomes hypertrophied and dilated. There is usually feebleness of pulse and emaciation. The cervical and other systemic veins are distended, and the circulation is impeded in the extremities and other internal organs, and anasarca, congestion of the liver and of the kidneys, with albuminuria, result.

*Physical signs.*—When emphysema is slight or limited, as occurs in cases of tubercles in the lung or in old age, there are no distinct signs to indicate its presence. Again, in cases of bronchitis emphysema may be suspected, if bronchitis be persisting for some time. Physical signs.

*Inspection.*—In well-established cases the physical signs indicate alterations in the shape of the chest and in its movements. The chest is dilated in all directions, is rounded and barrel shaped; the direction of the ribs is more horizontal than in health. The shoulders are elevated, and the muscles of the neck and shoulders appear very prominent, the intercostal spaces wider, and the cartilages quite rigid. *Movements.*—The superficial veins of the chest are enlarged, the expansive movements are absent or deficient, during expiration chest remains barrel shaped, and during inspiration it enlarges somewhat. Inspection.

*Percussion.*—Increase of resonance or heightened natural clearness. The resonance invades the area of dulness of the heart and of the liver. Percussion.

*Auscultation.*—Breath sounds are harsh or weak, and very indistinctly heard. Expiration is prolonged; occa- Auscultation.

sionally subcrepitant rhonchus, if bronchitis be also present. Heart sounds feebly audible, the heart being hidden and displaced.

Diagnosis.

*Diagnosis.*—The condition of chest may simulate it for pneumo-thorax. In emphysema both sides are enlarged, but in pneumo-thorax the affection is limited to only one side; besides, in pneumo-thorax percussion is more tympanitic, and during auscultation there is an amphoric echo. If one part of the chest in pneumo-thorax be percussed while the ear is applied to another part this amphoric echo is heard. Emphysema is often associated with asthma, bronchitis, or affections of the heart. No such complications exist in pneumo-thorax.

Prognosis.

*Prognosis.*—Once the disease is thoroughly established it cannot be eradicated; it increases the tendency to acute bronchitis.

Treatment.

*Treatment.*—Attempts must be made only to prevent or cure, or relieve the bronchial catarrh which associates with it, also to prevent its recurrence and to relieve also cough and dyspnoea. All known causes of emphysema must be avoided; attention must be paid to the condition of the alimentary canal. Relief may be obtained by invigorating diet, rest, warm clothing, and anti-spasmodics. The secondary affections, as asthma, cardiac diseases, pulmonary congestion, need cautious treatment. Improve the state of general health and remove the constitutional diathesis. Various remedies, as stramonium and camphor, have been used as cigarettes, but they only give temporary relief. A change of air is exceedingly beneficial, but the climate must be mild and not too dry.

Atelectasis  
pulmonum.

#### ATELECTASIS PULMONUM.

*Atelectasis pulmonum* or imperfect expansion of the lung is a condition observed in new-born children in

which large or small portions of the lung have not been expanded by air. The condition may also be met with in all ages in life as a consequence of collapse of once expanded lung or of their return to the non-expanded state. The latter is familiarly called *collapse* or *carinification*. Definition.

*Symptoms of congenital atelectasis.*—Child is born feeble and weak, the cry is also low and weak, the colour of the skin is pale and livid or whitish leaden ; the muscular movements languid and slow, or quite relaxed and motionless ; breathing is short and imperfect, and thorax moves very little during respiration. The infant continues for a time in this state and dies ; or symptoms gradually improving the respiration improves and child recovers ; or the symptoms continue with less severity and child grows feeble and weak ; the breathing is short, rapid, and imperfect ; the temperature is very low, and colour of skin continues blue ; the child takes milk very badly. Even such cases improve under care and proper management, but if respiration does not improve and skin becomes cold, and swallowing more difficult, and spasms of the muscles of the face show themselves and return quickly in succession, the child dies either from convulsions or from syncope. In these cases during inspiration the ribs move inwards towards the trunk, thus diminishing the transverse diameter of the thorax. In such cases the diaphragm descends, the lung, which ought to expand to fill the space, being collapsed leaves a vacuum, and the thoracic walls are thus drawn inwards by the atmospheric pressure. Symptoms.

Very often there may be no signs of atelectasis, perhaps, at the moment of birth, but they may appear in the first few weeks of life. In such cases there are symptoms of cyanosis and of other disorders of circulation due to collapsed lung, offering obstacle to the discharge of blood from the right side of the heart. The symptoms of cyanosis being



accounted for by the fact that the foetal openings of foramen ovale or of ductus arteriosus, are still patulous or in a condition to be reopened under pressure, and so to allow congested blood from right side of the heart to pass into the left, and thus to the whole body. In such cases the child may have been born quite healthy, or may have had some difficulty in re-establishing respiration. In them some weeks after birth difficulty of respiration, diminution of muscular power, cyanotic hue of the skin, with severe spasm of the limbs and trunk, occur, followed by stupefaction.

Prognosis.

*Prognosis.*—The child does not die immediately, but some time after birth. If the portion of imperfectly expanded lung be small, if the child be vigorous and the case properly managed, it may be restored to health. If the child continues weak or feeble even with all care and for weeks after birth the case is very fatal. In cases where collapse occurred some weeks after birth prognosis will vary with the violence of the symptoms. Where the collapse is extensive and organic changes are also found in the heart death always results.

Treatment.

*Treatment.*—Must be directed to the removal of its cause. If due to mucus in infant's mouth it should be cleaned, and vomiting provoked by tickling the fauces. Simulate artificial respiration. If due only to debility attend to hygienic laws, keep the room warm, and child well wrapped in flannel or rolls of cotton. Perfect rest is essential. Various means are adopted to rouse the respiratory force; the child is made to cry by friction to the surface, and plunging the body alternately into cold and warm water. Excite full inflation of the lung by blowing into the mouth. The child should have good breast or be fed by spoon with good cow's milk, to which a few drops of brandy may be added if necessary. Electricity to the pectoral muscles has been tried with good effect.

## [ COLLAPSE OF THE LUNG.

Collapse of  
the lung.

This term is used when lung tissue, without exudation or any other deposit, and which has once expanded, ceases to be permeable to air.

*Post-mortem appearances.*—The collapse may be diffuse or limited to a few vesicles. In the diffuse form a number of lobules are affected, and they give a solid appearance to the diseased portion. In the other or lobar variety the diseased part forms a hardened patch or tumour upon the surface, or into the interior of the lung. The collapsed lung is much reduced in bulk, wrinkled, of a dark violet colour, and engorged with blood; may be somewhat thickened and crepitating, or very dense, and sink in water with rapidity. When cut into, the surface is smooth, and uniform, and fleshlike. On pressure or scraping it bloody serum escapes. The lung tissue is intact. Congestion of the lung is a constant accompaniment in the state of collapse, and is connected with bronchitis in a few cases.

Post-mortem  
appearances.

*Causes.*—Presence in the bronchi of some condition which impedes the passage of inspired air; or want of power in the muscular apparatus which carries on respiration, are the chief causes. The deficient muscular power may result from exhaustion or debility; may be the result of diarrhœa, whooping-cough, or measles, or of unfavorable hygiene. In adults it may result from chronic pneumonia, phthisis or cancer, or morbid growths in the lung tissue, or from pressure of pleuritic effusion, of enlarged bronchial glands, or of thoracic tumour upon the lung. A child is born weak, or becoming so in after years, loses some portion of the respiratory muscular force, and thus inspiration becomes short and imperfect, and the portions of the lung distant from the primary air passages, not being reached by inspired air, become collapsed; while

Causes.

the presence of secretion in the bronchial tubes, accumulated from want of power to throw them off, furthers the development of collapse. Another mechanical condition which tends to produce collapse is a plug of any kind lodged and moulded in a bronchial tube. This plug will move with more difficulty towards the smaller end of the tube, and will therefore close it more tightly against the inspired air. If the expiratory force be strong it will be dislodged, but if only sufficient to slightly displace it, each inspiratory effort will bring it back to its former condition.

Symptoms.

*Symptoms.*—Bronchitis or pneumonia are concomitant with collapse, and the symptoms of them are generally combined. In cases where children die of utter exhaustion, the air is not carried into the deeper parts of the lung, and in them the symptoms of collapse show themselves only a short time before death. These are a sudden appearance of rapid and oppressed breathing, little or no cough, more or less dulness over different parts of the chest, a feeble or suppressed respiratory murmur, and imperfect bronchial respiration. When collapse occurs in the course of bronchitis, the bronchial affection is known to have lasted for several days, by sonorous, sibilant, or subcrepitant râles; when suddenly, or in a few hours, breathing becomes worse, pulse very small, feeble, and very frequent, the subcrepitant râles continue, and are heard with prolonged expiration, or with bronchial respiration; percussion also becomes dull and obscure. Symptoms of exhaustion set in, surface become pale and bluish, skin generally cold.

Prognosis.

*Prognosis* depends upon the amount of bronchitis which accompanies it, and on the state of the constitution. If bronchitis be extensive and the child weak the risk of life is very great. In simple debility it is dangerous, but not quite fatal. Recovery attends on careful management and hygiene.

*Treatment.*—Sustain the strength, regulate the temperature of the room and the child's clothing, and attend to the diet, which should be nourishing and strengthening. Brandy is the best medicine in such cases; the daily use of a gentle emetic of ipecacuanha has been recommended. In cases of sudden collapse local applications of weak mustard to the chest and extremities, or liniments of ammonia, or of turpentine, or of amber, may be tried over the chest. In chronic cases galbanum plaster may be used. Where emetics cannot be used, carbonate of ammonia with senega may be tried; a small quantity of opium may also be added. Opium may be given so long as cough and restlessness continue, and then be suspended. If prostration sets in with rapid and small pulse, skin cool, pale, or bluish, and breathing laborious, brandy may be administered.

When associated with bronchitis use such measures as tend to modify the inflammation of the bronchial mucous membrane and to diminish the amount of secretion, and also to unload the congested lung of its excess of blood. Cupping, counter-irritation, mustard foot-baths, &c., may be recommended. Emetics, followed by carbonate of ammonia, are favourite remedies.

### HÆMOPTYSIS.

*Hæmoptysis* means spitting of blood. The hæmorrhage may be from any part of the respiratory tract, and may be due to the following causes:—1. Rupture due to extreme engorgement of healthy capillaries, as in acute bronchitis in plethoric persons. 2. Rupture of capillaries whose walls are presumed to be diseased, as at the commencement of phthisis. 3. Bursting of a small aneurysm or a branch of a pulmonary artery. 4. Hæmorrhagic infarction in the lung. 5. Wounds of the lung. 6. Bursting of an aortic aneurysm into a bronchus or the trachea. The

Treatment.

Hæmoptysis.

Definition.

Causes.



term pulmonary apoplexy is sometimes applied to the form of hæmorrhage due to hæmorrhagic infarction.

post-mortem  
appearances.

*Post-mortem appearances.*—The first variety is rarely ever seen in post-mortem. In the second, though there may have been very profuse hæmorrhage, nothing more is seen in post-mortem than a little blood mixed with mucus in the air tubes or vesicles. In the third, which is usually fatal in a very short time, the opening can be found. In the fourth, the hæmorrhagic infarctions are conical, with its apex towards the root of the lung, and its dense structure is readily distinguished from the air-containing lung substance. In the sixth, the opening by which the aneurysm has burst into the trachea is often of considerable size, and has thickened edges. The opening is sometimes partially filled by a dense clot of fibrin, and a large quantity of blood has usually been drawn into the lung.

Symptoms.

*Symptoms.*—Hæmoptysis may come on with or without any warning. Patient feels a sense of weight and fulness about the chest, some dyspnœa, sense of heat, and tickling in the throat, and a saltish taste in the mouth. The blood is brought up in the mouth by coughing; it may well up without any effort, and in a sudden gush, when it may also escape from the nose; frequently vomiting is excited. The blood may be in a few streaks along with the sputa, or in so large quantity as to cause death. The blood is bright and florid, more or less frothy, occasionally (when abundant and suddenly discharged) it is dark, is usually liquid, but may be in clots. Recurrences are very frequent, and even periodical. Moist râles are often heard over the chest when the blood has come up in large quantities, but not usually for a day or two if it is the first hæmorrhage. Any blood that may afterwards remain in the lungs sets up irritation and inflammation and its consequences, and in this way fibroid phthisis may be produced.

DIAGNOSIS BETWEEN HÆMOPTYSIS AND HÆMATEMESIS. Diagnosis.

<i>Hæmoptysis.</i>	<i>Hæmatemesis.</i>
Spitting of blood.	Vomiting of blood.
Florid; frothy; containing air; slightly alkaline.	Dark clots mixed with blood; heavy, acid reaction.
Consolidation of lung.	None.
No sickness.	Sickness; often saltish taste in the mouth.
Faintness rare.	Faintness common.
Shallow chest.	Full abdomen.
Blood expelled by coughing; auscultation; crepitation in one lung, or in part of a lung; dulness, and other signs of consolidation.	Blood vomited with food; no chest physical signs.
History of tubercles or syphilis.	History of portal congestion, and of disordered stomach.
Malæna rare.	Black stools follow.

*Prognosis* in hæmoptysis depends upon the cause. In the first form the affection is probably altogether beneficial. In the second, the grave prognosis which all physicians, from Hippocrates downwards, except a few Germans, have drawn, is fully justified in a large proportion of cases, the hæmorrhage is followed by suppuration in the lungs. The third form is almost always fatal; and the sixth always so. In the fourth hæmorrhage itself is actually beneficial; but as the infarct is usually associated with morbus cordis, recovery is not to be expected. Prognosis.

*Treatment.*—Keep the patient at perfect rest, lying on his back, in a cool room, with the head raised on a pillow. Coughing and speaking must be forbidden. Diet should be small in quantity, and cold; and stimulants must be Treatment.

avoided. Ice, astringents, and vascular sedatives may be given internally. I have seen success attained by subcutaneous injections of ergotine.

## Pleurisy

## PLEURISY.

## Definition.

A pleurisy is said to be present when a person labours or has since being taken ill laboured under an acute continued pain in his side on inspiration, and with some of the following physical signs :—Distension of the chest wall, dullness on percussion, or friction sounds.

## Pathology.

*Pathology.*—Pleurisy varies in degree, in extent, and duration. It may occur as an original disease, or as a complication. It affects all ages. A sudden chill may cause it, but more often its cause is unknown. It is an inflammation of the serous membrane investing the lungs and lining of the cavity of the thorax, and like inflammations of other serous membranes, it is characterised by increased vascularity and redness in points or stripes, there are small ecchymotic spots ; the membrane is dry at first, but soon becomes thicker, softer, and clouded. The surface is dull and shaggy-looking owing to the minute delicate folds and papillary granulations firmly attached to the surface. Under the microscope they consist of newly formed fusiform cells and filaments of connective tissue, with elongated capillaries coiled into loops within them. These changes occur in every kind, whether there be effusion or none.

## Varieties.

*Varieties.*—These are four. The commonest forms of pleurisy are—*first*, that in which there is no free exudation ; *second*, with scanty but very fibrinous exudation ; *third* with abundant sero-fibrinous exudation ; *fourth*, with purulent effusion (empyema). Of these, the second variety is most common. In the first there are alterations in the tissues of the pleura generally on both

Morbid  
anatomy.

First variety.

surfaces, but they are not very extensive. Pleuritis may exist independently, but occurs also in croupous pneumonia and in phthisis. In the second variety the other alterations besides those common to the first kind take place and the surface becomes coated by a delicate coagulum of fibrin. The fibrinous deposit undergoes fatty degeneration and liquefaction, and is ultimately absorbed or adhesions take place. In the third variety the alterations in the pleura are very extensive. The effusion into the sac varies from two to ten pounds. The exudation consists of a clear yellowish-green serum or a quantity of coagulated fibrinous masses. The fibrinous coagula may float in the serum as flakes and lumps, or may traverse it as a loose network, or may be precipitated on the pleura. The longer the effusion remains the more rigid the masses of fibrin become, and they finally become fibrous. A few pus-corpuscles are also found both in the serum and in the fibrinous deposit. The proportion between serum and fibrin varies, sometimes there is a little blood, and very often soft adhesions. Parts of the effusion often become encapsulated. The thorax is dilated, the intercostal spaces widened, the diaphragm is forced down, and the mediastinum and heart displaced. The lungs are compressed. The lung on the unaffected side is the seat of intense collateral fluxion, and in fatal cases of collateral œdema. If recovery takes place the exudation gets thicker, and undergoes fatty degeneration, or liquefies, and becomes absorbed, and then adhesion always takes place. Often cheesy masses, the remains of exudation, are found embedded between the adhesions. When absorption takes place early, lung may re-expand, and heart, diaphragm, &c., regain their normal position. In other cases adhesions prevent re-expansion, and also draw in the chest, and displace the heart and liver. The *fourth* variety is empyema. In this the liquid portion of the effusion is very

Second  
variety.

Third variety.

Fourth  
variety.



rich in pus-corpuscles. The fibrinous portion also contains pus cells. The pus may become absorbed, but the general termination is that the pus-corpuscles are formed in the pleura itself. The tissue becomes opaque and softened, and irregular loss of substance occurs. External perforation or perforation through a bronchus may take place, and recovery occur.

Symp'toms.

*Symptoms.*—These vary with the extent, position, and intensity of inflammation, with the cause, and refer to the symptoms of inflammation of serous membranes generally ; they also refer to inflammatory exudations, to other products pressing upon the neighbouring parts and to the state of general health. There are inflammatory fever, dyspnœa, thoracic pain during breathing and physical signs. In some cases the symptoms are very insidious, there may be slight fever, loss of appetite, and pain on taking deep breath, or on twisting the body. The patient may follow his occupation, and after the lapse of a week or two the dyspnœa and pain may somewhat increase, and the implicated side may become distended with fluid. In other cases the symptoms vary with the variety.

First variety.

Second  
variety.

In the *first variety* there are no marked symptoms. In the *second* there is severe pain when the breath is drawn, and coughing and sneezing are especially painful. External pressure also causes pain. There is generally cough, but its cause is doubtful ; it may be reflex. There is generally little fever or other serious disturbances of health. The

Third variety.

*third variety* begins acutely with a rigor followed by intense fever, with full pulse, headache, pain in the limbs, coated tongue, and great thirst, or there are often several rigors, and sharp stitch at the beginning. There is cough, and this may be owing to collateral hyperæmia. There is very often dyspnœa, and it may in part be caused by hyperæmia and in part by pressure of the effusion. When the fever abates the dyspnœa subsides. After the disease

intensifying for six or eight days a sudden improvement may take place, which is followed by absorption. The absorption takes place rapidly at first, and then slowly. In this variety some cases are acute at first, and then become tedious. In them the fever moderates, but absorption does not take place. At last the effusion begins to become absorbed, but then fever begins again, and soon general adynamic symptoms appear. Another variety of this class begins slowly and progresses tediously. There is no great fever; no pain. There is slight shortness of breath and great prostration. This kind often ends in phthisis. The *fourth form* can only be diagnosed by long duration. Other symptoms are like the third. All three forms may end in recovery; generally adhesions take place. The sinking of the dulness line is not a certain sign of diminution of effusion, for it may occur from thoracic walls and intercostal muscles having become more yielding, or from the diaphragm having been forced further down. Incomplete recovery takes place when the compressed lung cannot expand.

Fourth  
variety.

In this form when an empyema points, an œdematous swelling appears on the wall of the chest, generally near the fourth or the fifth rib. A fluctuating tumour projects, and discharge follows, and ends in recovery. Sometimes incomplete recovery takes place, as in the above; sometimes a thoracic fistula results and lasts for years. If empyema points into a bronchus a tremendous gush of pus occurs through the mouth. Recovery in such cases is rare. Perforation through the diaphragm is followed by violent peritonitis.

In recent pleurisy usually a fatal result is caused by collateral hyperæmia; sometimes engorgement of veins and diminution of urine occurs. Death takes place often from the intensity of fever, or from tuberculosis.

*Physical signs.—Inspection.*—When the exudation is

Physical  
signs.

- Inspection. scanty the results are generally negative; but when the effusion is large the physical signs are well marked. In
- First variety. the *first variety* we find the intercostal spaces on a level
- Second variety. with the ribs or are prominent. In the *second*, when the effusion fills the entire chest, the whole side is dilated, or
- Third variety. there may be local bulging. In the *third* variety, if the effusion be on the left side, the displacement of the heart may be made out by inspection alone; if on the right side, the displacement of the liver. In the *fourth* variety the thoracic wall does not move on respiration as far as the effusion reaches; this is partly owing to the infiltration and palsy of intercostal muscles, and partly to non-expansion of the lung. If the diaphragm project into the abdomen and be not palsied, its contraction during inspiration pulls out the epigastrium; and sometimes after absorption the heart is pushed out of place by adhesions. Where the lung does not expand the thorax may shrink. It is therefore necessary in these cases to use the cyrtometer from time to time. In such cases, too, the heart may be drawn to the left as far as the axillary line. It must be remembered that even after shrinking of the chest some
- Palpation. effusion may remain. *Palpation*.—The sense of friction is often perceptible. There is friction fremitus where the effusion is in contact with the thoracic wall, and vocal vibration is diminished. At the limit of the effusion it is intensified, because the retracted pulmonary tissue is better than the unretracted. The abrupt transition from weak to increased fremitus marks the line of effusion. This is best marked in front and at sides; behind, the signs change more gradually. In these cases it is useful to ascertain the
- Percussion. position of the heart and liver. *Percussion*.—When the effusion is scanty it reveals nothing. Where large effusion occurs, we find in the second variety dulness over effusion. In the third there is hyper-resonance, and the lung is over retracted. The dulness is higher up behind

than in front. *Auscultation*.—There are in the first form friction sounds on inspiration and on expiration. These may be distinguished from a rhonchus by not being altered by coughing. Also a friction sound is heard, and very distinctly when the stethoscope is pressed firmly against the chest. It is rarely heard at the beginning. It is more often heard when the exudation is beginning to become absorbed. When the exudation is not large faint breath sounds are audible over the region of dulness; when large none are heard. In the other or unaffected lung the respiration is puerile. Auscultation.

*Terminations*.—Convalescence may occur at any stage. Many recover before absorption takes place; the fever and pain subsides and the friction sound vanishes. Recovery also takes place after absorption of the fluid or its removal by operation, and the lung expands fairly, the breathing improves, appetite grows better, and the condition of the body is recovered; the fluid is absorbed, and for a time pain and friction may be re-established, the lung enlarges and breath-sounds are restored, or lung in some part remains collapsed. Death, which is rare in acute pleurisy, may happen suddenly from asphyxia, syncope, or asthenia. The result of fluid effusion may lead to pulmonary congestion and œdema of the lungs; may pass into a suppurating form, leading to effusion of pus, retraction of the side, with extensive adhesions and non-expansion of the lung; or the purulent effusion may discharge, either externally, or by the bronchi, or into the intestines. Terminations.

*Diagnosis*.—Pleurisy is not always easy to distinguish from *pneumonia*. 1. Pleurisy rarely begins with a single violent chill. 2. The course of pleurisy is never unique. 3. In pleurisy the sputa is indicative of catarrh, but is never truly rusty. 4. In pneumonia the chest is not enlarged, the intercostal spaces not widened, the heart and liver are in their natural place. The dulness is not so absolute. Diagnosis.  
Pneumonia.



Enlarged  
liver.

Bronchial breathing is present. The pleuritic effusion of the right side may be mistaken for *enlarged liver*. In liver disease, 1, the liver rarely pushes the diaphragm upwards; 2, the dulness is higher in front than behind; in pleurisy the opposite condition holds. 3, when the liver is enlarged its lower border moves downwards on inspiration and upwards on expiration, but in large effusion the lower border is stationary; 4, from the thoracic wall in the enlarged liver the palpational transition is immediate. A small yielding interspace is generally discoverable between the border of the ribs and the surface of a liver is displaced downwards; 5, in enlargement of the liver the lower ribs may be bowed outwards, but if so the intercostal spaces are not effaced except in rare cases. The persistence of fever and emaciation may awaken suspicion that phthisis is developing.

Prognosis.

*Prognosis*.—If properly managed, cases of dry pleurisy, or where pleurisy is single and effusion scanty, generally terminate favorably. The decrease of effusion is a favorable sign; the sooner absorption occurs the better. The disease is serious in proportion to the amount of effusion, to the time the fluid remains in the pleura, and its nature. The symptoms of œdema of the lung and imperfect decarbonization of the blood are unfavorable signs. Caries of a rib is usually followed by a lingering course and death. A prolonged empyema may also lead to general amyloid disease and death from it.

Treatment.

*Treatment*.—It consists in subduing the inflammation and promoting the removal of its products. The patient must be kept perfectly quiet, and should be cautioned against any efforts; very often strips of plaster spread on some material are applied round the affected side; some use a flannel bandage for the same purpose. Immediate relief follows this kind of treatment when properly carried out, and the patient becomes able to breathe and cough

without pain. The quantity of effusion is diminished, and its absorption promoted. Wet cupping and the application of cold may be tried, or mercurial ointment may be rubbed in. If the fever be high vascular sedatives in small doses may be given with salines, as also digitalis and quinine. Hot linseed poultices or turpentine stupes or large blisters, are useful locally. The diet must be nutritious and liquid. If these means fail and effusion takes place, we must endeavour to promote absorption by giving syrup of iodide of iron. In such cases the patient should have a moderate diet free from stimulants, free counter-irritation over the chest, and purgatives and diuretics may be tried. Strapping the side further aids absorption. In many cases the fluid may be removed by tapping the thorax (paracentesis). The operation is a very safe one, and should be performed whenever the quantity of fluid is large or whenever, though small in quantity, there is reason to believe that the effusion is purulent. In such cases if the operation is deferred too long the purulent effusion may point into the lung, open into a large bronchus, and thus be expectorated, or may point externally, or the lung may become carnified and thus deprived for ever of its power of expansion. The fluid can be best removed by means of an aspirator. A common trocar and a cannula may, however, serve the purpose. The puncture should be made in the fourth intercostal space, and the whole quantity of fluid may be let out at once. In some chronic cases the aperture must be enlarged and kept open by a drainage tube, so as to admit of the cavity being washed out daily with antiseptics, or a counter opening lower down may be necessary.

#### HYDRO-THORAX

Hydro-  
thorax.

Is a simple dropsical transudation into the pleural cavity without inflammation. It marks the advance of general dropsy.

Causes.

*Causes.*—It occurs in valvular diseases of the heart, in Bright's disease, and in lung diseases which obstruct the right heart. It may also be caused by pressure upon the veins of the pleura.

Anatomical appearances.

*Anatomical appearances.*—It is generally double, but sometimes one pleura holds more fluid than the other. The fluid is clear, yellowish, and consists of water, albumen, and salts and serum of blood. It is distinguished from a pleural effusion by the absence of coagula, and of the inflammatory changes in the pleura. The surface of the pleura, however, may have lost polish, and be somewhat opaque. The subserous tissue is œdematous. Both lungs are of course compressed.

Symptoms.

*Symptoms.*—Those resulting from mechanical pressure, and interfering with the function of the lungs. Dyspnoea, and signs of decarbonization, are the only symptoms.

Physical signs.

*Physical signs.*—The same as in pleuritic effusion, except—1. The heart is not displaced. 2. Dulness is the same behind and in front, and when the patient is upright; the boundaries of dulness vary with the change of attitude.

Treatment.

*Treatment.*—The same as of general dropsy. If the dyspnoea be great relief may be obtained by tapping.

Hydro-pneumo-thorax.

### HYDRO-PNEUMO-THORAX.

Definition.

Pneumo-thorax alone is a mere temporary condition; fluid immediately follows the entrance of air into the pleural cavity, and makes the condition one of hydro-pneumo-thorax.

Causes.

*Causes.*—The rupture of a phthisical cavity is the commonest cause. Other causes are: an abscess of the chest wall may open into the pleura, and an injury from without.

Morbid appearances.

*Morbid appearances.*—There is an enormous distension of one side of the chest; with obliteration or prominence of the intercostal spaces. If a trocar be put in air gushes out,

and carbonic acid gas, with a little nitrogen and oxygen, escapes, also sero-purulent or purulent fluid. The lungs are collapsed and compressed, and pushed against the spinal column. The pleural sac usually acts as a valve. If there be air only the distension of the sac does not exceed that of inspiration; with effusion it dilates hugely.

*Symptoms.*—The moment perforation occurs it is perceived by the patient, and he feels as if something had given way, and this feeling is rapidly followed by dyspnœa; he can only lie on the affected side or else has to sit upright. The dyspnœa is partly owing to sudden compression of one lung, and partly to collateral hyperæmia of the other. There is severe pain about the lower ribs and signs of engorgement of the right side of the heart soon set in. The pulse is small; the urine scanty. Some die in a few hours from collapse, others recover a little to go on to die later. Recovery is rare. When pneumo-thorax changes into pleuritis, absorption takes place. Symptoms.

*Physical signs.*—These signs vary with the amount of air, with the quantity of fluid mixed with air, and with the extent of perforation into the lung. *Inspection.*—The side of the chest is dilated and motionless, and the position of the heart is altered. *Palpation.*—Displacement of the heart or of the liver. *Percussion.*—If the amount of air is extreme, there will be increased tympanitic resonance; when effusion is great percussion note will be dull, with much resistance, and dulness changing with change of position. In cases of fluid with air, dulness will be in the dependent parts. Physical signs.

*Diagnosis.*—From emphysema. 1. The emphysema is usually bilateral. 2. In emphysema the intercostal spaces and furrows are not bulged. 3. The breath sounds are weak, but not wanting. 4. The fremitus is perceptible. In pneumo-thorax it is absent. From a lung cavity by—1. Shrinking of the chest wall over a cavity. 2. The râles Diagnosis.  
Emphysema.  
  
Cavity in the lung.



are heard. 3. The organ is not dislocated. 4. In a cavity the pitch of percussion note is altered by opening and shutting the mouth.

*Prognosis.* *Prognosis.*—It is a grave affection, but is less dangerous if localized.

*Treatment.* *Treatment.*—Is only palliative. Strapping the side firmly, as in pleurisy, gives great relief. If the air is considerable, tapping and subsequent bandaging may be tried. Puncturing and stimulants may often relieve dyspnœa.

### TUBERCLES. CANCER.

*Tuberculosis.* *Tuberculosis.*—Grey miliary tubercle of pleura occurs in cases of acute tuberculosis. The tubercular granulations may develop in young and false membranes or may grow from the pleura after repeated attacks of pleurisy.

*Cancer.* *Cancer* never occurs primarily. Medullary sarcoma is the form which exists, and when extensive, the liquid collects into the pleura. Generally it cannot be made out during life. If there be pleural effusion after cancer of the breast, it is probable that cancer also exists in the pleura. The history will mainly help.

In such cases the treatment is only palliative, the distressing symptoms should be relieved.

### DISEASES OF THE CIRCULATORY SYSTEM.

#### HEART.

*Heart.* *Heart.*—Its bulk in health is nearly equal to one's fist. Weighs about nine to twelve ounces, and is smaller in females than in males. The ventricles contain about four ounces of blood. In thickness the right auricle measures about one line, the left about one and a half. The right

ventricle near the base at its thickest part is about two lines, and the left about its middle, where it is most thick, about five lines or more. The auriculo-ventricular orifice of the right side is larger than the left, and of the left larger than the arterial orifices.

The heart occupies the middle mediastinum, and is contained in a conical bag of pericardium, the apex being towards the root of the vessels. The pericardium consists of fibrous tissue which is continuous with the fibrous layer of vessels; of serous membrane, which forms the inner layer and closely invests the heart, and also forms a tube-covering for the pulmonary artery and ascending aorta. The cone extends from the diaphragm upwards to the second costal cartilage.

On opening the chest the heart is found obliquely placed. Its *base* is directed upwards, backwards, and to the right. The base is chiefly formed by the auricles, and from it the large arteries and veins proceed. The heart extends vertically from the fourth to the eighth dorsal vertebra. The *apex* is directed downwards, forwards, and to the left, and is seen or felt between the fifth and sixth costal cartilages, and a little internal to a line vertical to the nipple. The apex beat varies with the posture and the respiratory movements. The *anterior surface* faces upwards, and is formed above and to the left by a major portion of the left auricle and a small portion of the left ventricle, below and to the right by the right auricle and the right ventricle. The *posterior aspect* looks downwards and towards the diaphragm, and is formed by a small portion of the right and a major part of the left ventricle.

The *outer margin* of the left ventricle extends from the left second intercostal space outwards and downwards to the left fifth intercostal space. The outer border of the right ventricle extends from the sternal end of the left fifth costal cartilage downwards to the left fifth intercostal

Anatomy.

Base.

Apex.

Anterior surface.

Posterior surface.

Outer margin.

Pulmonary  
valves.

space. The *pulmonary valves* are the highest and the most superficial are situated behind the second left intercostal space close to the outer border of the sternum. The

Aortic valve.

*aortic valve* is deep seated, is overlapped by the pulmonary valve, and is close to the junction of the left third costal cartilage with the sternum, and even extends to the adjoining half of the sternum. Is on a same level as the

Tricuspids.

pulmonary, but behind the sternum. The *tricuspids* lie beneath the sternum and extend from the sternal end of the third left rib to the sternal end of the fifth right rib.

Mitral.

The *mitral* lie the deepest of all, behind the pulmonic and the aortic, and on a lower level than them. The mitral valve is on a level with the upper border of the left third cartilage a little external to the sternum.

A major portion of the heart is covered by the thin anterior edges of the lungs. The edges of both lungs meet in a mesian line of the sternum as low as the fourth costal cartilage; at this point the edge of the left lung extends downwards and outwards to the fifth left cartilage, and a triangular notch is formed bounded on either side by the edges of the right and left lung, and below by the diaphragm. This triangle is occupied by the right ventricle, and a small portion of the apex of the left ventricle is close to the outer space formed by the left border of the lung and the diaphragm.

Boundaries.

The heart is *anteriorly* covered by the lungs, from which it is separated by the pericardium and the pleuræ. *Posteriorly* it is separated from the vertebræ above by the roots of the lungs and posterior mediastinum, and below by the cesophagus and thoracic aorta. The heart lies *below*, on the diaphragm, and *above* it is continuous with the large vessels.

## DISORDERS OF THE HEART.

The heart, like other organs is subject to inflammation and various other disorders, giving rise to local and general symptoms, and to remote or general consequences.

The circumstances which interfere with the normal action of the heart are: 1, causes external to the heart; 2, the morbid affections of muscular walls; 3, alterations of the contents; and 4, diseases of valves.

1st. *Disorders external to the heart.*—*a. Displacements.* Disorders external to the heart.  
—In ascites or in abdominal tumours, the heart is displaced upwards and altogether to the left; in aortic aneurysm it is pressed downwards; in pleuritic effusions it is pushed over to the opposite side; in pigeon breast the heart occupies the whole of the space which lies between the two nipples. In cases of displacement the free or ventricular portion of the heart moves at its base as on a pivot. In displacement we generally find more or less palpitation of the heart, hypertrophy and dilatation of the heart, and also diseases of the valves, *b. Pericardial effusion* compresses the heart and thus disturbs its action.

2. *Muscular walls are liable to hypertrophy and atrophy.* Of muscular walls.  
—In hypertrophy the heart is called upon to do extra compensatory work. Atrophy occurs in many chronic diseases, and is associated with atrophy elsewhere in the body. The muscular tissue of the heart may become enfeebled with the rest of the frame, sometimes from dilatation and thinning, sometimes from fatty or other degenerations, sometimes from inflammations and morbid growths.

3. *Affections of the contents.*—The contents of the heart become coagulated when a patient is moribund or in a dying state. Of contents.

4. *Valves.*—The diseases of the valves lead to obstructive and regurgitant disorders. Of valves.

The action of the heart may be feeble or forcible; Action of the heart.



frequent or slow ; intermittent, irregular, or imperceptible.

**Total arrest.** The *total arrest* of the heart's action may be due to spasm or paralysis. It ought to be remembered that several of these derangements are often found in a healthy heart. *Feeble action* is found in wasting diseases ; at a later period of many fevers ; and in acute inflammations ; also in mitral diseases of the heart. In this condition the apex beat, the pulse, and the sounds of the heart are weak ; the first sound may even be abolished. *Forcible action* occurs in aortic valvular diseases or in venous congestion in cases of atheromatous or rigid arteries, and in gout or Bright's disease. In it there is violent cardiac impulse, which is also prolonged, heaving, and may even shake the whole body. The sounds of the heart are loud and the pulse is hard ; it may be dirotous, frequent, or slow. When the pulsation of the heart is painfully evident to the patient it is called palpitation, and the beats are violent, frequent, and sudden.

**Causes.** *Causes of heart disease.*—Generally ascertain if the disease be organic or functional. If organic, inquire into the nature, seat, and extent of the mischief ; whether the mischief be seated in the valves or there be any alteration in the size and capacity of the heart, or any changes in the structure of its walls, or if due to any effusions pressing upon the heart, or to any adhesions within the pericardium. The history of rheumatism, or of any sudden and violent exertion, or hereditary predisposition, or of old age, should be inquired into, as they tend to produce the disease.

**Physical examination.** *Physical examination.*—It is the only reliable means of diagnosing the diseases of the heart. By *inspection* we ascertain the shape and size of the chest over the cardiac region, and the character of the impulse. By *palpation* we determine the direction, extent, and the position of the apex beat or a friction rub, the degree of the impulse, and whether or not there is a thrill. By *percussion* the position,

direction, and extent of dulness of the heart, and by *auscultation* the characters of heart sounds, and of murmurs over different parts of the organ. We must also examine the arteries of different parts, and forcible or jerking pulsations in them indicate aortic disease. If there be any difference in the pulse of the wrists an aneurysm or tumour may be suspected, and it is always wise if one pulse is almost absent to make sure that an old wound has not led to ligature of the radial artery.

Auscultation.

Examine  
arteries.

In describing the morbid conditions of the heart, a convenient method of arrangement has been adopted. The diseases have been divided into those which are inflammatory and affecting the tissues of the heart, and those due to functional disorders. Of the diseases affecting the tissues, endocarditis is the commonest and most important, and therefore first treated. Endocarditis gives rise to all forms of valvular diseases, and to congenital malformations. Next in order is hypertrophy and dilatation, and like endocarditis are the result of valvular diseases and malformations, and are therefore classed under them. Next in order of the arrangement comes myocarditis. And, lastly, pericarditis as an inflammatory disease affecting tissues external to the heart. Other maladies of the heart are atrophy, local disorders as morbid degenerations and growths, laceration of the heart, and hydropericardium. Then follow the functional derangements of the heart. They include various nervous disorders, as angina, palpitation, syncope, and exophthalmic goitre. The exophthalmos has been already treated with diseases of the thyroid body. Thrombosis and embolism, although cursorily treated of in the former part of this work as a disorder of blood and circulation, have been further detailed here. And, lastly, in the scale we have grouped diseases of the arteries and aneurysms (thoracic and abdominal).

## Endocarditis

## ENDOCARDITIS

Is an inflammation of the lining membrane of the heart, and attacks those parts which are most exposed to strain or friction, and those parts of the valves which strike one another in closing. It rarely attacks the right side in the adult, and in the left chiefly the endocardium around and over the valves.

## Causes.

*Causes.*—Same as those of pericarditis with which it is often associated. Is occasionally due to rupture of valves or chordæ tendineæ. A more common cause is exposure to cold and rheumatism. About 20 per cent. of cases of rheumatism have endocarditis. In the early stage the next most frequent cause is a complication of acute and chronic Bright's disease. It occurs during acute fevers, measles, puerperal fever, and in them endocarditis may occur.

## Post-mortem appearances.

*Post-mortem appearances.*—We do not often see inflammation in the early stage. The most common congenital defects of the heart are due to foetal endocarditis of the right side. The extra-uterine is generally of the left. There is at first increased redness and vascularity; thickening of the membrane, which is less smooth and dry; there is proliferation of cells beneath the endothelium. As exudation occurs we find vegetations or warty growths or granulations upon the surface of semilunar and ventricular valves near their thin margins. The valves or delicate chordæ tendineæ become inflamed, and they become thickened or puckered, or, adhering together, their healthy action becomes permanently impaired, or they form warty cauliflower-like masses. Very often ulcers are found. In some cases fibrin is deposited upon their surface, from the blood by contact with these roughened structures. The deposits may become detached either in particles as granules or in masses, and form thrombosis, or as emboli and may be carried to the brain, lungs, and other important

organs, leading to paralysis or gangrene, or other serious consequences.

In some cases we notice laceration of the membrane, and also ulcerations from destruction of the tissues, formation of pus in the deeper layers, and perforation, rupture, and destruction of a valve, and formation of an aneurysm of the heart.

*Symptoms.*—When occurring during an attack of acute rheumatism, Bright's disease, or pyæmia, its symptoms are only recognised by the physical signs of valvular disease. There may be indication of its existence by symptoms of ill health and newly developed murmurs, where none existed before. There is little or no pain nor tenderness. Palpitation is constant. As a very small portion is involved in inflammation, there is scarcely any inflammatory fever; the pulse is somewhat accelerated, and the face is extremely anxious; cold sweats and increased heat of surface. The chief symptoms depend on interference with the circulation of blood at one of its orifices, and on formation of clots in the heart, ultimately leading to embolism. In some varieties, ulcerative destruction occurs in the affected parts, or its morbid products give rise to septicæmia, to extreme prostration and death. Symptoms.

*Physical signs.*—Endocarditis unless it causes permanent or temporary valvular disease is indicated by no definite physical signs. The sounds of the heart are usually somewhat obscured, but this is a sign too uncertain to be of any diagnostic value. Physical signs.

*Sequelæ.*—The disease of the valves is the most common sequel. It may also cause dilatation leading to hypertrophy. Sequelæ.

*Prognosis.*—Death rarely occurs suddenly in acute rheumatism, but is most common when it accompanies Bright's disease. But the disease is always serious. Perfect recovery is rare. Fresh attacks are common. Detachment of clots, which are conveyed as emboli, are very common. Prognosis.



**Treatment.**

*Treatment.*—It consists in the removal of the disease in the progress of which it occurs. Stimulants with abundant nourishing diet are essentially required. If signs of obstruction from coagulation in the cavities are present, bicarbonate of ammonia with stimulants should be given. Where there is great acceleration and feebleness of pulse give digitalis. If pulmonary vessels are engorged remove a little blood.

**Malformations of the heart.****MALFORMATIONS OF THE HEART.****Varieties.**

The chief congenital malformations are due to arrested development, or to inflammation of the endocardium during intra-uterine life, or they are varieties in the structure of the heart at an early period of foetal life:—1. Two cavities, one auricle, and one ventricle. 2. Three cavities, two auricles, and one ventricle. 3. Four cavities, but imperfect septa between auricles and ventricles. At a still later period:—1. Premature closure of foramen ovale and of ductus arteriosus. 2. Permanent patency of the foramen ovale, allowing the free passage of blood between the two auricles. 3. Patency of the ductus arteriosus, it remaining open after birth, and allowing admixture of blood, both from the aorta, and the pulmonary artery. 4. Defects leading to later mischief, as defects of valves. 5. Irregularities of great vessels. The origin of aorta and pulmonary artery from one single ventricle. The aorta and the pulmonary artery arising from the reverse instead of their normal ventricle. 6. One arterial trunk instead of two separate from one ventricle and it then divides into two. Pulmonary artery arising by two roots. Descending aorta given off from pulmonary artery. Pulmonary vessels entering into right auricle, and systemic vessels into the left auricle.

**Symptoms.**

*Symptoms.*—In some cases two or more malformations are found together. These malformations give rise to a

prominent affection known as *cyanosis*. Besides the discoloration of the surface these abnormalities lead to general venous congestion and dropsical effusions and clubbing of the fingers and toes, to the intermixture of the arterial and venous blood, or to the transposition of the venous for the arterial blood.

The venous congestion may be due to the obstruction at the pulmonary artery preventing the flow of blood through the lungs, or from them into the right side of the heart.

*Cyanosis*—literally means blue disease. It is also called *Cyanosis*. *morbus cæruleus*, and is characterised by a blue discoloration of the skin, and may be due to deficient construction of the heart, or to affections which obstruct the circulation of blood through the heart and interfere with its proper aeration, as occurs in lung diseases where the obstruction exists to the passage of air through the larynx or trachea, in obstructive bronchial diseases, in pulmonary congestion, in oedema and in emphysema. It is commonly seen in cholera and in diseases of right side of the heart, and is often congenital.

Three varieties of cyanosis are found—1, it may come on at once; 2, it may come on after a time and be permanent; 3, it may be in paroxysms and not be permanent. In these cases the impulse of the heart is usually powerful, often an unnatural murmur is heard. Lividity sometimes may come on only during the paroxysms; sometimes there may be pallor. Normal colour returns slowly after blanching by compression of the chest, and compression of the chest often relieves a paroxysm. The extremities are cold, the patient is liable to bronchitis, the fingers and toes are bulbous, there are sores on hands and feet and about the arms. *Varities.*

In these cases death may most frequently occur from cerebral disturbance, from lung diseases, from serous effusions, or from general exhaustion. In grown-up subjects death is usually due to tuberculosis of the lungs. *Termination.*

## Diagnosis.

*Diagnosis.*—In cyanosis there is soon after birth palpi-tation, dyspnœa, and symptoms of decarbonization.

If a case of malformation goes beyond fifteen years, statistics show that the pulmonary artery is contracted. In such cases a loud systolic murmur will be heard in the præcordial region, and most intensely at the level of the nipple and between it and the sternum. Is most distinct in the course of the pulmonary artery, or from the base of the heart towards the middle of the left clavicle, and less distinct in the course of the aorta or at the upper part and right side of the sternum.

Cases of cyanosis often live for years, and even with malformations. Males are more prone to it than females. In Bombay I had a case of a girl who lived till eleven years of age, and had marked blueness of the skin all over. Her nails were incurved; the ends of fingers and toes clubbed and bulbous; there was lividity of the lips; marked coldness of the skin and of the breath; and continued palpitation and dyspnœa. She also suffered from bronchorrhœa. In such cases the *physical signs* are those of hypertrophy and dilatation of the left ventricle, and occasionally murmurs. The patient generally becomes accustomed to a semi-asphyxiated state, and lingers long; the death is hastened by pulmonary complications.

## Treatment.

*Treatment.*—The patient should constantly wear flannel next the skin. Take plenty of nourishing and stimulant diet. Every source of exposure to cold must be avoided. Residence in pure mild air is necessary. Avoidance of fatigue and mental excitement is most useful. If the patient cannot swallow give enemata of stimulants with antispasmodics. Blood should be confined to the central parts by warmth and stimulant applications to the extremities. In extreme cases galvanism, artificial respiration, and even transfusion may be tried.

## VALVULAR DISEASES OF THE HEART.

Valvular diseases.

History.

The most common and most important diseases of the heart are the valvular diseases. They obstruct the onward course of blood, or permit of its regurgitation. Most of them result from inflammation which gives rise to a deposit of lymph upon and beneath their serous membrane, and the valves lose their thinness and brilliancy, become thick, indurated, and puckered up, or adherent to one another, or to the opposite walls. Very often exudations undergo fibroid degeneration, or even atheromatous or calcareous degeneration, and the valves are covered with them. Sometimes they become covered with warty excrescences, or vegetations. Thus, the valves may become injured or lacerated, or covered with deposits. They are rendered inefficient to guard the orifices which may become dilated or narrowed. When the orifices are dilated the valves are incompetent to close, and regurgitation of blood results. Where the orifices are narrowed the valves obstruct the normal flow, and obstruction is the consequence.

*Causes.*—Valvular diseases may be due to acute endocarditis, especially in connection with rheumatism, gout, or Bright's disease; to fibroid, calcareous, or other degenerations of the valves as observed in old persons; to violent physical work in young persons, and in whom the great pressure is thrown upon the aortic valves; to congenital malformations; and to dilatations of the heart. Further detail of causes has been given with each description of valvular diseases. Causes.

*Symptoms.*—The symptoms produced by valvular disease of whatever variety are due to three circumstances—1, the too great fulness of the venous and too great emptiness of the arterial system; 2, malnutrition of the heart itself; and 3, the effects of embolus. During health the normal operation of the valves of the heart may be said to be as follows:— Symptoms.



Normal  
action of  
valves.

With the contraction or systole of the ventricle the mitral valve is closed, and if competent it prevents the blood from flowing back into the auricle, the potency of the aortic valves, which are laid back, allow it to go freely away on its circuit. With the diastole or dilatation or filling up of the ventricle, the mitral valves open and the aortics are closed. During disease, when one or more of these valves are implicated, their healthy action is interfered with, and abnormal sounds are produced, known as *murmurs* or "bruits." These may be produced at any one of the four orifices of the heart, and vary with the contraction and dilatation of the heart. These are called *regurgitant* and *obstructive* murmurs according to the rhythm or the time when they are heard. These often replace the normal sounds or are superadded to them.

Diseased  
action.

Reduplicate  
sounds.

Very often as a diseased process the sounds of the heart become intermittent, and are then known as *reduplicate* sounds. These reduplicate sounds are generally intermittent, the sound being double with some beats and not with others; they have a close relation with the movements of respiration. In them the first sound reduplicates at the end of expiration, and at the beginning of inspiration. The second is double at the end of inspiration and at the beginning of expiration. *Reduplication* is due to the homologous valves (the two cusps and the two sigmoid valves) not being closed at precisely the same time, from some difference in the amount of pressure exerted upon the valves, the difference of pressure itself being dependent upon the different states of respiration.

Causes.

Endocardial  
murmurs.

*Endocardial murmurs.*—These are due to some disproportion in the relationship between the force of circulation of the blood, and the cardiac orifices. They are the result of molecular vibrations in the blood which are rendered intense or modified or low by disease of the valves. In a natural condition each orifice freely admits the blood, and

when the orifice is closed it shuts the blood off completely ; not so in disease where, during the systole, any one of the four orifices remaining open, it obstructs the onward free passage of blood, or when the orifice is partially closed it allows the blood to regurgitate. Thus, a murmur is produced while the blood flows onwards from the ventricle into the artery and during the systole. This is known as obstructive murmur. On the other hand, a murmur is produced while the blood flows backward from the artery into the ventricle and during the diastole, this is called the regurgitant murmur.

*Causes.*—1. Roughness of the endocardium. 2. Fibrinous coagula among the columnæ carneæ. 3. State of the valves, as thickening, roughening, atheroma, fibrous deposits. 4. Abnormal condition of vessels, as aneurysm, by their loss of tone or lessening of their calibre, or by pressure from a tumour. 5. Abnormal condition of the heart, as dilatation of its cavities, or irregular contraction from valvular diseases. Causes.

Murmurs are found in, 1, endocarditis ; 2, vegetations in the valves and in the cavities ; 3, laceration or atheroma of the valves ; and 4, congenital malformations. They are heard loudest at the apex and the base of the heart, and coincide with the systole, præ systole, and diastole. Murmurs are generally loudest over places where they are developed, but in consequence of the intervention of the heart and lung structure they are not loudest at those points where they are generated. They are often carried by the blood stream, and are hence loudest in the course of the vessels than in the opposite direction. Murmurs.  
Seat.

The murmurs are best remembered as to their place and time. *Place.*—They are heard at valvular orifices, and are hence known as pulmonic, aortic, tricuspid, and mitral murmurs. *Time.*—The time is divided into four periods : 1, auricular systole, a period which immediately precedes Place.  
Time.

the impulse; 2, ventricular systole, when the murmur accompanies the impulse or accompanies the first sound; 3, aortic systole, when the murmur follows the impulse or accompanies the second sound; 4, the period of rest when the whole heart is at rest.

The murmurs vary in intensity, quality, and pitch. *Intensity*.—May be very indistinct, or heard from a short distance. *Quality*.—May be harsh, rough, or whistling. *Pitch* is generally prolonged, and gradually subsides.

Characters of  
pulse in  
murmurs.

The state of the *pulse* is a great aid in determining the nature of murmurs. As a rule it is soft and compressible in mitral, and hard and jerking in aortic disease. The *pulmonary* symptoms are more common in mitral disease, while cerebral complications are associated with aortic disease.

Besides the murmurs just enumerated there are others known as inorganic murmurs—functional or hæmic—and they are due to any change in the composition of the blood or to the presence of a clot into the cavities of the heart. These murmurs are best heard at the floor of the neck, in the course of the carotids, and also in the veins of the neck. Anæmic murmur is a kind of soft blowing murmur.

Causes of  
obstruction.

*Causes of obstructive murmur*.—These may be—(1) Diseases of the valves, leading to constriction at or about their orifices, or thickening of their margins, or the enlarged, adherent, and nodulated valves, which cannot fall back; (2) pressure from without, as of a tumour upon the orifice; or (3) twisting of the orifice of the valves, owing to displacement of the heart.

Of regurgita-  
tion.

*Causes of regurgitation*, or backward return of blood—These are—(1) Enlargement of the orifice owing to the valves not being wide enough to fill up the orifice; (2) organic changes in the valves which prevent them closing pro-

perly, as thickening, perforation, or adhesion to walls; (3) degeneration of the great arteries.

*Division of murmurs.*—1, mitral regurgitant, 2, mitral obstructive, 3, aortic regurgitant, 4, aortic obstructive. Besides these there are other divisions of minor importance.

## MITRAL MURMURS.

Mitral.

*Mitral regurgitant or obstructive* is heard in the recumbent posture, becomes less loud or ceases altogether in the erect posture, for what reason it has not been clearly ascertained. It attends the systole, and is synchronous with the pulse.

*Causes.*—Those circumstances which lead to dilatation of the mitral orifices; as mere contraction of the free edges of cusps, rupture of the chordæ tendineæ and perforation of the valves. Acute endocarditis. Irregular contraction of the papillary muscles. Chronic endocarditis supervening upon aortic disease. Mere dilatations of the left cavities. Causes.

*Post-mortem appearances.*—In *regurgitation* there is more or less contraction, and narrowing and shortening of the valve tips, with irregularity, thickening, and rigidity. The valves enclose calcareous matter, and are also atheromatous. The tender edge of the valve disappears and its place is taken by a clumsy pad. There may be laceration, or rupture, or shortening, with thickening, adhesions, and fibrinous deposits. The chordæ tendineæ have given way, the valve tips are inverted, or the chordæ tendineæ may be shortened. The left auricle, the pulmonary artery and vein, and both auricles and ventricles of the left side are thickened and enlarged. There is moderate dilatation of the left ventricle, and the right ventricle is much hypertrophied. In cases of *obstruction* the lower edge of the valve tips may be united, so as to make a funnel, perhaps barely big enough to hold the little finger. The vegetations which cover Post-mortem appearances.  
Regurgitation.  
  
Obstruction.



the valve may often contribute to their occlusion. There is dilatation of the left auricle and also of the pulmonary veins and arteries. The left ventricle is small. Whether in regurgitation or in obstruction, the amount of blood propelled is smaller than natural, hence aortic circulation has too little blood, the pulmonary too much.

Symptoms.  
Regurgita-  
tion.

*Symptoms of regurgitation.*—Dyspnœa is extreme. The serum fills the air-cells of the lungs and causes carbonic acid poisoning, and stupor therefore sets in. The œdema may last for years. More rarely metastasis causes death. As in aortic disease where the increased circulation is compensated by hypertrophy of the left ventricle, so in mitral disease there is hypertrophy of the right ventricle. In mitral disease the compensatory hypertrophy of the right ventricle cannot obviate the overcharge of the pulmonary circulation. Hence patients are always short of breath from hyperæmia of the lungs. The vessels of the bronchi are less affected, hence there is not necessarily bronchial catarrh. Even at an early stage unusual exertion may cause the patient's death from acute pulmonary œdema. Often for a time the patient enjoys tolerable health. The patient looks pale from lack of blood, but need not be cyanosed. The compensatory hypertrophy of the right ventricle has always certain limits beyond which the valvular disease generally increases. In mitral *obstruction* the blood pours into the left ventricle with such a force as to diminish the contents of the aorta; the veins and capillaries are overloaded, and lips and cheeks are blue. The overflow of the embarrassed cerebral veins causes headache. The liver is enlarged, and obstruction of the hepatic veins may even lead to jaundice. The complexion may thus be rendered green. Chronic, gastric, and intestinal catarrh, and menstrual derangements from engorgement of other veins occur. The urine is scanty and albuminous, with cylinder casts. The venous engorgement also ob-

Obstruction.

structs the thoracic duct, and thus impedes the supply of nutritive materials to the blood. The transudation of serum is also favoured by an impoverished condition of the blood, and it also leads to dropsy. Dropsy generally begins in the ankles, then extends to the thighs, scrotum, and abdomen. This is sometimes accompanied by erythema, hydrothorax, and hydropericardium. All these conditions make the condition of the patient desperate.

*Physical signs.*—*Regurgitation* or incompetence. On inspection, palpation and percussion, we notice increased impulse and alteration of the position of the apex. True pulsation of the veins does not occur, but sometimes a rhythmical pulsation of the jugular, synchronous with the heart's systole, is visible. This proceeds from the transmission of a wave of vibration from the tricuspid valve. *Auscultation.*—A loud *systolic murmur* replacing or immediately following the first sound is heard, not over the valve but at or above, or outside the left apex beat, which part is the most superficial. It is conducted round the left side of the chest, and frequently heard in the axilla, behind and between the scapulæ and the spine, or at the lower angle of the left scapula. It diminishes in tone from the apex to the base, and increases again over the aortic orifice, where it approaches nearest the chest. The systolic non-regurgitant murmurs are not heard there. This may be accounted for by the knowledge of the anatomy of the left ventricle being to the left and back of the heart; also the murmur is carried back with the regurgitant blood into the left auricle. The pulse is irregular in frequency and force, and usually soft and frequent.

*Results.*—More or less suffering from congestion of the liver, lungs, and kidneys. It rarely ends in sudden death. The arterial system is insufficiently supplied with blood, and there is extreme anæmia; and though the heart may be acting violently, and the large arteries in the neck

Physical  
signs.  
Regurgi-  
tation.

Results.

throb, there is scarcely any pulsation in them. In these cases emboli may be carried as clots from the right side of the heart into the lung, and may cause pulmonary hæmorrhage or apoplexy. As a result of regurgitation, at first the left auricle becomes dilated and hypertrophied, the right then follows, and ultimately ends in tricuspid regurgitation. In long-continued cases the lining membrane of the left auricle gradually undergoes degeneration, becomes thickened, opaque, and atheromatous.

Physical  
signs.

Obstruction.

*Physical signs.*—*Stenosis.*—On *inspection, palpation, and percussion*, the physical signs are of excentric hypertrophy of the right ventricle. The impulse is not so strong because the left side of the heart does not take part in the hypertrophy. *Auscultation.*—There is a murmur after the second sound or before the first. It is loudest at the apex beat, and is generally *præsystolic*. It is a fact that during diastole the blood flows passively through the auricle into the ventricle, and that just before the ventricle itself contracts the auricle also contracts, and forces onward its blood with some vigour. The murmur thus produced is known as *præsystolic*. Very often regurgitation accompanies obstruction, and therefore the *præsystolic* murmur may go into a *systolic* murmur.

After some time in this disease, when the auricle has become fully dilated and hypertrophied, and when the time occupied in discharging its contents is protracted, the murmur becomes more intense and of longer duration. Thus, this murmur comes to be heard during the ventricular diastole, often even blending with the systole. The interval between the murmur and the first sound often becomes indistinct, and the murmur itself may pass for the first sound, and thus the true first sound comes to be mistaken for the second. The subsequent second sound is then supposed to be a reduplicate sound. The *præsystolic* murmur is of short duration, is deepened, rough, and

heard at the apex and over a limited area. It is not heard behind, or at the base of the heart, or at the angle of the scapula. There is sometimes a præ systolic apex thrill, associated with murmur.

*Symptoms* of mitral obstruction are for the most part the same as those of mitral regurgitation, but the distress is greater. This is particularly to be observed when the patient is suffering from bronchitis. The dyspnœa is intense; the patient is unable to lie down, at the same time there is often a very copious watery sputum. This was noticed before auscultation of the heart was practised, and the sputum designated *pituitous*.

Symptoms of  
obstruction.

*Treatment*.—The chief point in the treatment of mitral disease is the use of digitalis. The pituitous sputum is an indication for a calomel purge. Other details will be found under the general treatment of valvular diseases.

Treatment.

## AORTIC REGURGITATION AND OBSTRUCTION.

The closure of the aortic valve is mechanical. The auriculo-ventricular valve requires the muscular contraction of the papillary muscles for closure. Aortic regurgitation occurs if during the diastole the blood pressure is not enough to press them together, the semilunar valves therefore form a cone with the apex downwards. Aortic obstruction results when during the diastole the semilunar valves do not lie properly back.

Aortic  
regurgitation  
and  
obstruction.

*Causes*.—These changes in the valves are the result of endocarditis, or of chronic endoarteritis. Atheroma or calcification is a very frequent cause in old people and in persons who are subject to violent physical work.

Causes.

In aortic affection there is great excentric hypertrophy of the left ventricle, its wall may be an inch thick and the cavity capable of holding a fist. The mouth of the aorta may contract so as to barely admit a little finger, and this may be owing to thickening of the valves. Simple ob-



struction does not cause dilatation of the left ventricle. Aortic regurgitation and obstruction generally co-exist.

Morbid  
anatomy.

*Morbid anatomy.*—In aortic regurgitation the valves project inwards and form a cone, there is shrinking and shortening, and they are rigid, thick, irregular, and contracted, and cannot be pressed back, but resist the closing force of blood, often covered with fibrinous masses, and the opening of the artery may be thus closed. Rarely a valve is adherent to the aortic wall or torn from its attachment.

Physical  
signs.  
Aortic  
obstruction.

*Physical signs of aortic obstruction.*—On *inspection*, *palpation*, and *percussion*, we find the results of hypertrophy of the left ventricle. The carotids pulsate markedly, and there is a diastolic murmur in them. The pulse is accelerated and jerking. *Auscultation.*—Aortic systolic murmur is heard from the commencement of the systole and during the whole of the systolic period. The murmur is loudest at the base of the heart at the level of the second right intercostal space and along the right half of the sternum. Is distinct over the course of the ascending aorta up towards the right clavicle, and even in the carotids in the neck, sometimes even in the descending aorta and in the back, the murmur diminishing as the stethoscope is moved from the base towards the apex. It is synchronous with the pulse and also the impulse. There is also a systolic thrill at the right base sometimes. If no regurgitation there will be feebleness or absence of the aortic second sound, that heard over the pulmonary artery being unaffected.

Physical  
signs of  
regurgitation

*Physical signs of regurgitation.*—*Palpation.* There is occasionally a diastolic thrill. The pulse has a characteristic jerking quality and it is generally sudden and sharp, and often known as the water hammer pulse. *Auscultation.*—A well-marked diastolic murmur. Commences with the second sound of the heart, and often replaces it. It is

generally prolonged up to the commencement of the systole. It is distinct in the neighbourhood of the aortic orifice, and diminishes at the apex of the heart. It is rapidly lost along the ascending aorta. The arteries appear tortuous, visible, elongated, and movable with each systole. In course of time the vessels become atheromatous.

*Symptoms of obstruction.*—The ultimate effect of obstruction is to retard the arterial circulation. The arterial blood returns to the lung with less frequency and hence becomes venous. The aorta and its branches are inadequately filled, and the veins are engorged. The pulse is regular, small, compressible and prolonged. The arteries being imperfectly filled, there is general pallor, and symptoms of anæmia of the brain, and cyanosis and dropsy result. But these effects are for a time neutralised by compensatory hypertrophy of the left ventricle, hence, in this affection there is little suffering for years. There may be palpitation of the heart, but not constant. In advanced cases the disease also involves the mitral valves, and mitral regurgitation results. The fibrinous clots often detach from the valves, and give rise to signs of emboli in the brain accompanied by hypertrophy or degeneration of the heart. In such cases the symptoms vary as one or the other predominates.

Symptoms of  
obstruction.

*Symptoms of regurgitation.*—The regurgitation which arises from excentric hypertrophy gives rise to dizziness, headache, and spots before the eyes. Sometimes such cases die suddenly of apoplexy. More rarely asthmatic attacks occur. In obstruction there is paleness of the face and fainting fits. The period of comfort sometimes ends suddenly either because the hypertrophied heart degenerates, or from the supervening mitral regurgitation causing chronic endocarditis, or from atheroma. Dropsy and cyanosis occur, and death is due to œdema of the lungs or from embolism.

Symptoms of  
regurgita-  
tion.

In these cases the heart becomes after a time hypertrophied, and there is extreme dilatation of the left ventricle

which is in excess of that required for compensation, and therefore causes distension of the arteries. Symptoms result in sudden death, and there are sudden attacks of dyspnœa and oppression over the chest.

In this condition the hypertrophied heart is subject to degeneration, owing to the coronary vessels which supply nutritive blood to the heart not getting blood with sufficient force owing to the incompetency of the valves, and to the deficient elasticity of the vessels and to atheromata.

Treatment.

*Treatment.*—In *regurgitation*, the same as in cases of ventricular hypertrophy. In *obstruction*, give rich food and wine. If compensation of ventricular hypertrophy is imperfect give digitalis.

Tricuspid murmurs.

#### TRICUSPID MURMURS.

Regurgitation.

*Tricuspid regurgitation* is rare. When the disease occurs it is due to over-distension of the ventricles or to comparative shortness of the muscoli papillares leading to inadequate valves; the heart becomes displaced, and the right ventricle is hypertrophied. In mitral regurgitation, dilatation of the right ventricle takes place and with it tricuspid regurgitation, and ends in chronic thickening and contraction of the valves.

Causes.

*Causes.*—It is associated with the dilatation of the right cavities due to obstruction in the lungs or emphysema, or follows mitral disease.

Post-mortem appearances.

*Post-mortem appearances.*—The orifice may be simply dilated, or the valves thickened, contracted, and deformed, or covered with fibrinous deposit.

Physical signs.

*Physical signs.*—*Inspection.*—Diffuse pulsation over the right ventricle. Pulsation and fulness of jugular veins. In these cases valves of jugulars also become insufficient, and there is real pulsation of the dilated jugulars perceptible both to inspection and palpation. *Palpation.*—A systolic thrill has been felt in the epigastrium, but is un-

common. *Percussion*.—There is increased cardiac dulness. *Auscultation*.—A systolic murmur, soft and low toned, is best audible over the lower part of the sternum (ensiform cartilage), diminishing at left apex or base, and absent at the back of the chest.

*Symptoms*.—There is fulness of systemic veins, especially of the neck and upper arm. There is excentric hypertrophy of the right ventricle with enlargement of the auricle. The venous system is seriously engorged. Dyspnœa and cardiac dropsy result. Mitral regurgitation and emphysema of the lung go with it. Symptoms.

*Tricuspid obstruction* is seldom or never present. When it occurs, it may be congenital. There is a præ systolic thrill, and in a few cases there will be a præ systolic murmur, but is generally diastolic and loudest at the bottom of the sternum. Tricuspid obstruction.

### PULMONIC MURMURS.

Pulmonic murmurs.

Endocarditis is very rare in the right side of adult heart, atheroma of pulmonary artery is also rare, and, therefore, diseases of the pulmonary valves are not often seen. Pulmonary stenosis and regurgitation at the pulmonary orifice is also rare. Pulmonary stenosis or obstruction is usually due to congenital constriction of the orifice; sometimes valves are thickened, atheromatous, or calcareous. In these cases excentric hypertrophy of the right ventricle occurs.

*Symptoms*.—There is dyspnœa. Hæmorrhagic infarctions follow the insufficiency, and cyanosis and dropsy follow the stenosis. Symptoms.

*Physical signs*.—*Regurgitation*.—There is a diastolic murmur, best heard in the second left intercostal space and along the sternum. *Obstruction*.—A strong systolic thrill is felt and seen on the left third rib. The systolic murmur is heard loudest at the same spot and at pulmonic orifice. It is loudest at the left edge of the sternum or about the level of the third costal cartilage, also heard over the trunk Physical signs.



of the pulmonary artery, and as high up as the second costal cartilage. Organic murmurs are rare; they are generally congenital, while anæmic murmurs often are heard over the pulmonary valves and are transient. The pulse is not affected in this affection as in aortic murmurs.

All these murmurs are frequently combined. The aortic regurgitant is often combined with mitral obstruction; mitral regurgitant with aortic obstruction.

Inorganic  
murmurs.

*Inorganic murmurs* are heard in the different spaces. They are best heard over the base of the heart and over great arteries; are single and systolic, often accompanied by a murmur in the neck, not attended by any turgid condition of the vessels, and usually disappear when the patient ceases to be anæmic.

TABLE OF MURMURS.

<i>Systolic.</i>	<i>Diastolic.</i>	<i>Præsystolic.</i>
Mitral regurgitation.	Aortic regurgitation.	Mitral obstruction.
Aortic obstruction.	Tricuspid obstruction.	
Tricuspid regurgitation.	Pulmonary regurgitation.	
Pulmonary obstruction.		
Best heard at apex—mitral murmurs.		
Best heard at base—aortic murmurs.		

Prognosis.

*Prognosis.*—Prognosis in cases of valvular diseases of the heart must always be a guarded one, for unexpected alterations frequently take place. There is in the Museum of

the College of Physicians of London the heart of a Fellow of the College who died, at the age of more than 80 years, in the last century. It exhibits extreme disease of the aortic valves, disease which almost certainly began early in life. But this must be regarded as an almost exceptional case, and it may be laid down as a first principle that valvular disease materially shortens life, and the earlier in life it begins the more disastrous are its consequences. Children In children. born with congenital malformation rarely exceed the age of three years. One reason why valvular disease in childhood is likely to have more serious consequences than the same lesion later on, is that the growth as well as the nutrition of the heart is interfered with. A child who gets valvular lesion under the age of five may hardly be expected to exceed thirty years of subsequent life. The habits and opportunities of the individual affect his heart, as also all his tissues, and good nutrition and care will enable such patients to live much longer than ill-nourished. The form of valvular disease is an important element. In *mitral* disease death is usually gradual, in *aortic* disease Mitral disease. it may be gradual, but is often sudden. Cases of mitral obstruction terminate much sooner than those of mitral regurgitation. Indeed, of all forms of valvular disease mitral regurgitation may be regarded as the least dangerous to life. Lung disease frequently terminates the life Lung disease. of persons having any form of valvular disease. It must be borne in mind that various accidents are liable to occur: thus, hemiplegia or infarction of the lung may suddenly give rise to serious aspects to a case. The extent of dropsy is not always to be taken as an index of the danger of the case, as persons with very extensive dropsy may frequently recover when given rest and proper treatment, but repeated attacks of faintness, of angina, or of urgent dyspnœa are always of grave import.

*Treatment.*—The affection is incurable, the disease has a Treatment.

tendency to increase, the secondary effects are those of hypertrophy and dilatation of the chambers of the heart, which greatly embarrass circulation. Our object ought therefore to be—1, to prolong life, if not to cure the disease; 2, to prevent further mischief arising; and 3, to ward off untoward symptoms. Nature indicates a compensatory effort to overcome the obstacles to the flow of blood and hypertrophy ensues. We must therefore endeavour to maintain it as long as possible by preventing mental exertion or any increased cardiac action. The dilatation often accompanies hypertrophy, but since dilatation is due to impairment of muscular strength, it may be avoided by attention to diet and health.

The patient should attend to hygienic laws, give up any laborious occupation, and should avoid sudden efforts of body or mind; fatigue must always be avoided and carriage driving in the open air does good. A proper amount of sleep should be obtained, and non-conducting clothes next the skin are advisable. All abuses and excesses should be avoided.

The diet should be nutritious, not stimulating, and regularly given. The bowels should be kept free, and dyspepsia relieved; very often, notwithstanding every precaution, the disease becomes more and more apparent. When urgent symptoms arise, absolute rest is far more valuable than any other remedy. The frequency of pulse and its irregularity may be attended to by giving strength to the heart. When the heart's action is markedly irregular, *digitalis* is the best remedy. *Digitalis* is said to render ventricular contractions more powerful and complete, less frequent and more regular; it also combats unusual irritability; hence by *digitalis*, the periods of rest between the contractions become longer, the blood is driven more forcibly and in greater quantity into the aorta, the aortic recoil is improved and so is the nutrition of the

*Digitalis.*

cardiac walls. Many prefer belladonna to digitalis, and some use iron in combination with digitalis. It may be generally used with perfect safety in mitral, but requires close observation in aortic diseases. During the use of digitalis its effects should be watched as regards the cardiac action, the pulse, urine, and dropsy.

If the cardiac action be rapid, irregular, embarrassing, and the pulse weak, digitalis calms the heart and makes it act regularly, and more vigorously; under its use the pulse becomes more regular and fuller. Digitalis is especially recommended if the pulse be intermittent and also feeble. Under its use the urine increases in quantity if dropsy be present. This increased action of digitalis on the kidneys is similar to its action on the heart. It is thus that the arterial tension in the kidneys becomes increased, and the flow of water through the renal vessels promoted. Digitalis is contra-indicated if there is tendency to faintness, if there are noises in the head, and vomiting. In an advanced stage of heart disease large doses may be required.

In cases of simple dilatation, where the heart's action is inefficient, larger doses of digitalis can be borne with effect. The mitral and the pulmonary diseases, and other changes due to them, are often relieved by digitalis. It prevents irregularity of the heart's action, and thus causes the muscoli papillares to act regularly, and also checks regurgitation, which depends upon its disturbed action. In aortic regurgitant disease it need not be used. In tricuspid regurgitation, with enlargement of the right ventricle, it must be given with caution. In fatty degeneration it must also be used with caution; in it, it aids in causing contraction of the muscular fibres which are still left healthy. Is contra-indicated in extensive atheroma. In functional palpitation and in bronchitis associated with heart disease its use is much extolled. Symptoms which arise during the course of heart disease need special attention. These



are palpitation, angina, shortness of breath, dropsy, jaundice, albuminuria, pulmonary apoplexy, &c. The pain of angina may often be relieved by sedative plaster, by antispasmodics, and nitrite of amyl. Palpitation and dyspnoea are often relieved by sedatives. To relieve the overloaded venous system or dropsy, which sets in sooner or later, diuretics, diaphoretics, and chiefly digitalis, are most useful. Shortness of breath and engorgement of the lungs, or even angina, may be relieved by ether, ammonia, lobelia, ipecacuanha, and other expectorants; gin or whiskey may be tried. Purgatives are often needed. To procure sleep in the early stage, give sedatives, but in advanced cases they are inadmissible, as they paralyse the respiratory muscles, and lead to death.

Aneurysm  
of the heart.

### ANEURYSM OF THE HEART.

The slightest result of endocarditis is a local thickening of the endocardium, giving rise to no symptoms, and only discovered in post-mortem. The commonest result is valvular disease, of which congenital malformation is considered to be one form; a third, and a very rare result, is what is called aneurysm of the heart.

Causes.

*Causes.*—A rapid breaking down of the endocardium in endocarditis causes the heart wall to yield at a particular spot. This is nearly always at the apex of the left ventricle on the outer side. A dilatation is the result, and this may increase to almost any size. The orifice of communication with the left ventricle always remains small; being very rarely larger than a goose quill. Occasionally a rupture takes place between the layers of the valves. This forms what is called an aneurysm of a valve; but, clinically, it is only to be classed with valvular disease.

Symptoms.

*Symptoms.*—The symptoms are usually indefinite, and a diagnosis can rarely be reached. Aneurysm of the heart has,

however, been sometimes correctly diagnosed during life by exclusion of all other means of accounting for a great extension of cardiac dulness, accompanied by feeble heart sounds, and irregular action.

## HYPERTROPHY OF THE HEART.

Hypertrophy  
of the heart.

*Hypertrophy* signifies an increase in the size of the organ, and also of the relative thickness of the walls of its different chambers. The healthy heart is of the *same size* as a closed fist. The walls of the left ventricle are thicker than those of the right, as it has to do more active work than the other. Hence the right side is to the left as 2 to 5. The natural *weight* of the heart is about 10 ounces. In hypertrophy it increases to 16 ounces, or even to 32 ounces. The normal dimensions are as follows: —The left ventricle in males is 5 lines, in females  $4\frac{1}{2}$  lines. The right ventricle in males is 2 lines, in females  $1\frac{2}{3}$  line. The right auricle in males and females 1 line, the left auricle  $1\frac{1}{2}$  line. In hypertrophy the left side is generally affected.

*Varieties.*—Hypertrophy may be *simple*, in which case the muscular parietes become thickened without any dilatation in the size of the cavity corresponding to it. When the walls become thickened, and the cavity is also larger than natural, it is called *excentric* hypertrophy, or hypertrophy with dilatation. When the thickness is accompanied with corresponding diminution in the size of the cavity, it is called *concentric* hypertrophy. The latter occurs in congenital malformations, but never as a result of disease. Excentric hypertrophy with dilatation is common. The excentric variety is the commonest, and may occupy the whole heart, or the right or the left side. The simple is rare, and when it occurs may affect the left side only. It is chiefly met with in cases of Bright's disease. The concentric is extremely rare. Where the heart is excessively hypertrophied it is placed deeper in the chest, and lies transversely, the

Definition.

Normal size.

Weight.

In  
hypertrophy  
Weight.

Dimensions.

Varieties.  
Simple.

Excentric.

Concentric.

base being to the right and the apex to the left side. Hypertrophy of the heart is generally compensatory, and thus in organic heart disease hypertrophy is beneficial.

Pathology.

*Pathology.*—Hypertrophy is due to obstruction to the flow of blood to and from the heart or through the vessels. The heart is put to extra work, and therefore receives an extra supply of nutritive materials, by which its muscular structure becomes strengthened. The left ventricle is more hypertrophied than the right, and ventricles more so than the auricles. In cases of regurgitations a larger quantity of natural blood is contained in the chambers, and therefore the heart also becomes dilated. In most cases of mitral obstructive disease there is a large quantity of blood in the left auricle, and therefore that chamber is dilated. In cases of *pulmonary obstructive* valve disease there is extra work on the right ventricle, and hence it becomes hypertrophied.

Causes.

*Causes.*—The general cause is increased contraction. There are five originators of hypertrophy. 1. Dilatation; 2, stricture of outlets and contraction of the valves; 3, aneurysm of aorta and pulmonary artery; 4, obstruction in the range of aortic and pulmonary current. These chiefly occur in the lungs in lung diseases, and hence we find hypertrophy of the right side of the heart. In aortic constriction the chief cause of hypertrophy is atheroma and Bright's disease. 5. General plethora. 6. Adherent pericardium may also cause hypertrophy. The cavity which has the most strain becomes hypertrophied. Hypertrophy is most marked in the walls, sometimes the left ventricle, and sometimes the right.

Post-mortem  
appearances.

*Post-mortem appearances.*—There is numerical increase of the muscular fibres, and the heart is increased in bulk; this varies in proportion to the amount of hypertrophy; the heart is also increased in weight. Where dilatation and hypertrophy are combined the heart is more or less globular and the apex obliterated. If the left ventricle is

merely hypertrophied the heart is elongated and conical. When the right side is affected, the heart is generally rounded and increased in breadth, and the right ventricle and apex lie forwards. In enlargement of the right side the apex is displaced to the left, the right border becomes more horizontal, and is also increased in an upward direction. The walls of the left ventricle are from one and a half inch to two inches in thickness, that of the right from one inch to one inch and a half. The muscular walls are of a darker colour, and the tissues very firm and resistant.

*Symptoms.*—Hypertrophy, when strictly compensatory, Symptoms. is not attended with any serious symptoms. It is difficult to state symptoms separately as other combinations coexist. Thus, cyanosis and dropsy are not caused by hypertrophy. Hypertrophy of the left side gives rise to increased aortic circulation, and hypertrophy of the right to increased pulmonary circulation. In hypertrophy of the left ventricle, as in aortic disease, the pulse is hard and the arteries tense, and have a tendency to degenerate, and the brain is congested. In that of the right ventricle, as in mitral diseases, the epigastric pulsation is a prominent feature, and the pulmonary arteries are tense and apt to become dilated and degenerated, and there is congestion of the lungs. The distension of the arteries due to excessive hypertrophy may also lead to their degeneration and rupture. Hypertrophy usually ends in cerebral apoplexy.

*Physical signs.*—*Inspection.*—The thorax is bulged. Physical signs.  
*Palpation.*—It is to be borne in mind that the force of the apex beat will depend upon the width of intercostal spaces. There is great intensity of impulse, which is large and heaving, and the apex is displaced. The extension is downwards and outwards as low as the eighth rib, an inch or two outside the nipple. *Percussion.*—The area of cardiac dulness is increased, and it varies with the part of the heart affected. *Auscultation.*—The sounds are normal.



**Prognosis.** *Prognosis.*—Hypertrophy is often compensatory, and therefore is favourable in vascular diseases of the heart. Danger arises from hypertrophy with dilatation and from degenerative changes and other sources of failing health.

**Treatment.** *Treatment.*—Stop immoderate eating and drinking, avoid any exertion or excitement. Keep the bowels well open. Digitalis should be used with caution. Remove the cause of hypertrophy, keep the circulation free and regular, and the patient at rest and free from any excitement. If there be enfeebled heart and great debility tonics may be given. If the heart acts violently digitalis with sedatives may be tried to combat violent impulse and heaving. If dyspnœa be urgent stimulants may be given. In cases of hypertrophy with dilatation antispasmodics and tonics and remedies which promote digestion give temporary relief.

### DILATATION OF THE HEART.

**Dilatation of the heart.** *Dilatation of the heart* occurs in cases where the cavities are enlarged and their contractile power is diminished.

**Varieties.** *Varieties.*—These are—1, the cavity is dilated and the wall comparatively too thin; 2, the cavity dilated and the wall positively thinner; 3, cavity dilated, but the wall thickened through spurious hypertrophy.

In dilatation the auricles are most affected, then the ventricles, and the right ventricle more than the left.

**Causes.** *Causes.*—A mere impediment to proper contraction of the heart cannot cause dilatation, because as soon as the contractile force of the heart is less than the resistance of its contents the circulation will stop. The result of an obstacle during systole is that a cavity is incompletely emptied. In cases of obstruction during diastole the cavity will be nearly full. Thus, in aortic and mitral regurgitation the left ventricle is dilated. Dilatation also arises from increased pressure of blood into the cavity, and is usually followed by hyper-

trophy. The loss of muscular tone, as from serous infiltration ; from degeneration, as occurs in typhus, chlorosis ; from fatty degeneration of an excentric hypertrophied heart ; all lead to dilatation.

*Morbid appearances.*—A heart distended with blood is often mistaken for one having undergone putrefaction. The dilatation is usually partial, and the right side is most frequently dilated. The valves are normal. Under the microscope we generally find degeneration of the walls. The arteries are contracted, the veins engorged, and the blood is generally venous.

Morbid  
appearances.

*Symptoms.*—These are developed slowly, as localised pain about the heart and inability to active exertion. There is palpitation, dyspnœa after exertion, and irregular or strong, powerful, and jerking, or intermittent pulse. In cases of degeneration the symptoms point to syncope and feeble pulse. When dilatation is extreme the functions of the heart will be disturbed, the circulation will be improperly carried on or will become languid, the blood will thus be insufficiently aerated, the veins will become over-filled, and the arteries will be somewhat emptied. The patient on any slight exertion complains of severe anginal pains, and palpitation. Gradually there are signs of pulmonary congestion, lips and cheeks become blue, and liver swells ; there is œdema of the extremities in the evening. The dropsy spreads to the thighs and scrotum, and arms and face become œdematous. There is effusion into the peritoneal and pleural sacs, owing to decrease of the arterial contents. The urine is scanty, it contains albumen, and there is a copious deposit of urate of soda on standing.

Symptoms.

*Physical signs.*—No heaving impulse ; the apex beat is beyond the normal place and is increased towards the right side. The præcordial dulness is increased. The sounds of the heart are feeble ; sometimes murmurs may be heard.

Physical  
signs.

Treatment.

*Treatment.*—Light but nutritious diet is essential. Avoid any exertion. Use stimulants in moderation. For cyanosis give digitalis combined with iron.

### MYOCARDITIS.

Myocarditis.

*Myocarditis* is inflammation of the muscular substance of the heart, its tissues become flabby, and disintegrated. It generally occurs in connection with pericarditis or endocarditis. In endocarditis it may occur in spots, forming aneurysm of the heart. Valvular diseases and embolism of the coronary arteries also lead to it, and it may be due to syphilis, scarlatina, typhus, and pyæmia. The inflammation extends from the covering (pericardium) or the lining membrane (endocarditis) to the substance of the heart, and the walls of the left ventricle, generally the apex, suffer more than any other part. In some cases the entire wall becomes affected, and occasionally pyæmic abscesses or abscesses due to embolism are found in its substance.

Morbid appearances.

*Morbid anatomy.*—At first there is discoloration and softening of the heart's substance, which is dark and bluish red, the muscular fibres lose their striated appearance, become soft and greyish, and are less resistant, and subsequently, if no resolution takes place, may break up. The substance becomes infiltrated with serum and pus, or becomes contracted and hardened or cicatrised, where the inflammatory action is limited it gives rise to aneurysm or abscesses may form. These may burst into the pericardium, and lead to pericarditis, or into the cavities of the heart, and lead to pyæmia and embolism.

Symptoms.

*Symptoms.*—Seldom diagnosed during life. When complicated with endocarditis or pericarditis the action of the heart suddenly becomes weak and irregular, there is more or less fever, with typhoid symptoms and signs of blood poisoning followed by collapse.

## PERICARDITIS

Pericarditis.

Is an inflammation of the fibro-serous covering of the heart. History.  
It may be due to local irritation or to constitutional causes.

*Causes.*—Local causes are injury, as wounds, or fractured Causes.  
ribs, or a neighbouring abscess in the muscular walls of the heart opening into the pericardium. It may be secondary, and due to croup or extension from neighbouring inflammation of the lungs, or pleura, or peritoneum, or of posterior mediastinum, and is then localised. Growths within the pericardium, rupture of aneurysms, and even exposure to cold, which lead to rheumatism, also lead to it. As regards rheumatism one case in every three is generally complicated with pericarditis. Rheumatic pericarditis is more common among women than men, as one to five, especially in young and delicate women, and is rarely fatal at the time. It is often associated with chronic albuminuria, pyæmia, scarlatina, and chorea, and tubercular, cancerous, or syphilitic growths. Aneurysm of the aorta also leads to it. It may be the consequence of puerperal fever, and variola.

*Anatomical characters.*—There is increased vascularity, Morbid appearances,  
with tendency to proliferation of the endothelium. At first the membrane is thick and œdematous; soon the sac becomes filled with serum and plastic coagulable lymph. In exudative pericarditis there are two points to be considered—1, changes of the pericardium, and 2, the quantity and quality of exudation. At first the pericardium is reddened, with here and there extravasations and dark-coloured, homogeneous red spots. The tissue is relaxed with serous infiltration, and is readily torn. The visceral surface is dry, the membrane becomes shaggy, there is development and degeneration of young connective tissue cells, thus leading to pseudo-membranous formation and to pericardial adhesions. The pericardial effusions present all the modifications mentioned under pleurisy. The exudation soon separates into a liquid and a solid



portion. Small accumulations form at the anterior and upper part of the sac, and at the root of the great vessels. If in larger amount the entire sac is distended and the lower lobe of the left lung is compressed.

Varieties of  
exudation.

Sero-  
fibrinous.

Fibrin.

Blood.

Pus.

*Varieties of exudation.*—It always contains some pus-corpuscles, but often very few. It is called *sero-fibrinous* if only the coagulated fibrin is found in it. Sometimes delicate fibres cross from one surface to the other. In other cases the exudation is heavily charged with *fibrin*, which is extensively precipitated on the walls of the pericardium, forming reticulated masses: This form is most common in acute rheumatism. Often *blood* from the capillaries is found in exudation; if little, the serum is reddish, if much, it is black. Hæmorrhagic exudation occurs in Bright's disease and in cachexia. It is also found in chronic pericarditis.

If the pericardium contains within its cavity much *pus*, the contents are liquid, yellow, and opaque. The purulent exudation arises exactly as empyema, and may often be found in septicæmia, in puerperal fever, &c. In very rare cases the exudation is putrid, fœtid, and ichorous.

#### TABULAR VIEW OF PERICARDIAL EFFUSION.

##### *Kind of exudation.*

1. Sero-fibrinous.
2. Fibrinous (pure).
3. Hæmorrhagic.
4. Purulent.

##### *Diseases it most commonly accompanies.*

1. Where inflammation is transmitted from other organs.
2. Acute articular rheumatism.
3. Morbus Brightii, cachectic subjects, topers, tuberculosis.
4. Septicæmia, puerperal fever.

*Results.*—In recent cases the substance of the heart is not affected. In long standing cases of pericarditis, it is sodden with serum, is softened and flabby, so that extensive dilatation supervenes. The effects of pericarditis depend upon the degree of thickening of the pericardium and the amount of coagulated matter in the effusion. If the effused matter be sero-fibrinous and small in quantity, it is soon absorbed; the liquids are first, and then the solids after they have undergone fatty degeneration. The thickening leaves behind spots which are of no consequence; but if effusion has long continued, serious consequences arise, and adhesions remain. The young connective tissue becomes firm and fibrous, so that the pericardium forms a dense capsule round the heart. The parietal surface of the pericardium is generally less thickened; it may be joined to the visceral layer. When death occurs in the height of the disease we find some cyanosis and often general dropsy.

*Symptoms.*—It is rarely a separate disease. It can hardly be described simply. When a pleuritis or a pneumonia extends into the pericardium it is generally unnoticed. In acute rheumatism the physical signs are often the only indications.

In the *beginning* there is rarely any rigor or aggravation of fever. The *subjective* signs are pain and palpitation of the heart after food or exercise. The pain shoots to the left shoulder or left arm, and is generally aggravated by pressure upwards and on the epigastrium. Sometimes there is inflammatory fever, and the pulse increases in frequency, sometimes it is retarded. With the *effusion* the characteristic pain subsides, the palpitation increases, and the sounds are weak. The pulse is now feeble and irregular. The right side of the heart is full of blood, and there is venous congestion, with imperfect aeration of blood. The functions of the lungs and the brain are disturbed. The face is expressive of anxiety and distress. There is head-

ache and sleeplessness, with violent delirium or stupor, subsultus and convulsions. Dyspnœa is increased when there is passive hyperæmia of the lungs, and also more severe when the effusion compresses the lungs. The decubitus is generally on the left side. The best signs exclusive of the physical signs are—1. Pain in the præcordial region; 2. Palpitation; and, 3. Subsequent dyspnœa. If pericarditis is a complication of tuberculosis or Bright's disease, or chronic heart disease, its invasion is still insidious, and the physical signs are the only guide.

Terminations.

*Terminations.*—The forms which accompany pneumonia, pleurisy, or acute rheumatism, generally terminate favorably and the disease is always acute, and the recovery is complete. In cases of effusion the recovery is followed by permanent ill health. In Bright's disease and in tuberculosis the favorable termination is less common. In myocarditis the recovery is rare.

Acute pericarditis may pass into a chronic state. A few cases of chronic pericarditis occur from rheumatic pericarditis, and there is abatement and increase of symptoms for a considerable period of time. This form very rarely recovers. Death from œdema of the lungs is the commonest end.

Sequelæ.

*Sequelæ.*—In almost every such case the sequelæ are—1. Adhesion of the heart and the pericardium; 2. Dilatation of the heart; 3. Atrophy and fatty degeneration of the heart.

Physical signs.

*Physical signs.*—During *inspection* we rarely notice any bulging. *Palpation.*—The impulse is weaker and imperceptible, and may be felt too low down. *Percussion.*—Unless the exudation is large the percussion denotes nothing. There is dulness at the root of the aorta and the pulmonary vessels. It may extend to the second rib, and may pass beyond the right edge of the sternum. When the effusion is very copious the dulness is triangular with the base downwards and the blunt apex above. The

dulness often passes beyond the left mammary line and to the right border of the sternum. The extension of dulness to the left beyond the apex beat is a positive sign of the existence of liquid in the pericardium. *Auscultation.*—The heart sounds are feeble, a distinct to and fro or double friction sound is heard. The friction sound may be absent if the deposit of lymph be soft, or only limited to one surface. Very often as endocardium is also implicated, and especially the mitral valve, there is a systolic bellows murmur which masks the friction sound. The friction sounds, however, are not isochronic with the cardiac tones.

*Diagnosis.*—Most apt to be taken for endocarditis. Pain is commoner in pericarditis. Endocardial sounds are isochronic with the heart's action, while the pericardial are not. Extra pericardial friction sounds cease entirely during inspiration, and are superficial, and heard over a large area. The friction sound is intensified or altered by pressure of the stethoscope. Diagnosis.

*Prognosis.*—It is a grave disease. Is dangerous if it occurs in the course of other complaints. In rheumatic fever it is not so serious for its immediate as for its after consequences. Prognosis.

*Treatment.*—When it occurs during rheumatism the latter must be primarily treated by suitable remedies. Opium is very useful to relieve pain. If the subject be robust in the early stage a few leeches to the præcordia may be applied, but linseed poultices and fomentations are more serviceable than bleeding; nourishment should be light and liquid. Absolute rest of body and mind are essential. In cases of effusion promote absorption by a large blister or a succession of small blisters over the heart, with diuretics and iodide of potassium. If complicated with Bright's disease or with low fevers stimulants are needful, in such cases opium is highly injurious; sometimes paracentesis has been tried but with little success. Treatment.



Adhesion of  
the heart and  
pericardium.  
Morbid  
anatomy.

### ADHESION OF THE HEART AND PERICARDIUM.

It is a consequence of pericarditis. It may sometimes be partial and sometimes total. Sometimes there is firm agglutination of surfaces, and sometimes there are long bands of connection.

Symptoms.

*Symptoms.*—When the adhesion is simple, there are no marked symptoms; when the pericardium is dense, the case is different, the propulsive power of the heart is reduced, the pulse is small and irregular, and there is dyspnœa, with cyanosis and dropsy.

Physical  
signs.

*Physical signs.*—There is sinking of the intercostal space at the apex beat at each beat of the heart, which is the best test.

Hydro-  
pericardium.

### HYDRO-PERICARDIUM.

Forms.

Depends on an increase of the normal liquor pericardii, a fluid which contains little albumen. *One form* occurs when the heart is atrophied or when the lungs are adherent to the pericardium. *Another form* is due to venous obstruction on the right side of the heart, an abnormal pressure is thrown on the pericardiac veins and dropsy of the sac results. The collections of water found in the pericardium in mitral disease are of this kind. A *third variety* is the effect of dropsical crasia, as in Bright's disease,

Anatomical  
characters.

in cancerous cachexia, &c. *Anatomical characters.*—If the liquid contains fibrin it is not a hydro-pericardium, but it belongs to the class of inflammatory pericardial effusions. The quantity of fluid is variable. 3j or 5xij is not pathological. 3iv, 3vj, to several pounds is found in disease.

Physical  
signs.

*Physical signs.*—The heart's impulse is feeble; but its sounds are clear. Some writers state that dulness extending to the left of the apex beat is a positive proof of hydro-pericardium as opposed to pericarditis; but this statement has been disputed.

*Treatment* of dropsy generally.—Repeated counter-irritations to the præcordia and tonics are required. *Treatment.*

## PNEUMO-PERICARDIUM.

Pneumo-pericardium.

*Causes.*—Air may get in through a wound or through perforation by carcinoma of the œsophagus, or the gas may be generated by the decomposition of the effusion. *Post-mortem appearances.*—The pericardium is distended and air escapes with a hissing sound on puncture. *Symptoms.*—The occurrence is generally attended with collapse. *Physical signs.*—In this, a very rare condition, the intercostal depressions over the heart are obliterated. Succussion and splashing sounds are said, by those who have observed it, to be audible. *Prognosis.*—The disease is rapidly fatal. *Causes.*  
*Post-mortem appearances.*  
*Symptoms.*  
*Physical signs.*  
*Prognosis.*

## DEGENERATION OF THE SUBSTANCE OF THE HEART.

Degeneration of heart.

1. *Flabby heart.*—An abnormal softness and flabbiness of the substance of the heart is seen post-mortem in syphilis, septicæmia, and puerperal fever. There is no important alteration of structure. *Flabby heart.*

2. *Fatty heart* occurs from increase of fat on its surface, and from fatty metamorphosis of primitive fasciculi of muscular substance. The accumulation of fat occurs in obesity, cancer, and in drunkards; there is a layer of fat about half an inch thick in the sulcus; under the deposit the muscular tissue becomes atrophied. In fatty metamorphosis the fibrillæ are converted into fat granules, which gradually fill the entire sarcolemma. The substance of the heart is pale and yellowish, and tearing easily. It is accompanied by arcus senilis and atheroma of arteries; ossification of the coronary arteries and amyloid degeneration may also give rise to it, and it may follow hypertrophy. Amyloid degeneration generally occurs in hypertrophy of the right side *Fatty heart.*

of the heart. The walls are rigid, and the cut surface is like bacon, and gives an amyloid reaction.

*Symptoms.* *Symptoms.*—The degeneration is apt to cause dilatation and its consequences. It gives rise to shortness of breath.

*Feeble heart.* 3. *Feeble heart.*—The pulse is slow, and there is tendency to faintness. There may be cyanosis and dropsy. It may lead to rupture of the heart. The right ventricles are mostly affected, so are the sulci, base, and apex. There is frequently ossification of the coronary arteries.

*Fatty degeneration.* 4. *Fatty degeneration.*—In this degeneration the transverse striæ and nuclei of muscular substance are transformed into oil globules. It occurs in elderly persons, in those who suffer from exhausting diseases, and from chronic alcoholism. *Yellow degeneration* is a variety of fatty degeneration, in which the muscular wall is pale, buff-coloured, and greasy, and muscular fibres are more easily friable and studded with oil globules; and fibres have lost their natural structure and become irregular tubes, containing fat globules. It is common in advanced life, and due to a poisoned state of the blood and other morbid tendencies, or to disease of coronary arteries impairing the nutrition and vitality of the heart. When conversion of muscular fibres takes place into fibrous tissue instead of fat globules, it is then known as *fibroid degeneration*. It often occurs in syphilis.

*Symptoms.* *Symptoms* are those of weak heart. It often leads to uncomfortable sensations, as palpitation on exertion, shortness of breath, giddiness, faintness, cold extremities, and feeble and easily compressible pulse. There is imperfect arcus senilis due to fatty degeneration of edges of the cornea. Degeneration is one of the recognised causes of sudden death.

*Physical signs.* *Physical signs.*—Feeble impulse, and sounds from forty-five to fifty per minute.

*Prognosis.* *Prognosis.*—Very unfavorable. Occurs at all ages, in men more than in women, and most frequently in advanced life.

## MORBID GROWTHS IN THE HEART.

Morbid  
growths in  
the heart.

May affect the heart or pericardium, or both. These are tubercles, syphilitic gummata, cancer, and parasites. All these are extremely rare.

*Miliary tubercles* are found occasionally in the muscular walls. *Symptoms* are those of tubercles in other parts or organs, and of their presence in the pericardium setting up pericarditis. Tubercles.

*Syphilitic gummata*.—In this affection there is fibroid infiltration, causing thickening and adhesions of the pericardium. A ventricle is usually the part affected. Sometimes tumours, which protrude into the cavities of the heart, are found; at other times the growth causes thinning of muscular walls, and leads to aneurysmal dilatation. *Symptoms* are those of chronic heart disease and of enfeebled heart. Dropsy is of common occurrence. Syphilis.

*Malignant* is rare. It is usually melanotic; when it occurs it is always secondary. May be in nodules or masses, and encroach upon the cavities of the heart and impede its circulation. The sarcomatous growth often infiltrates the muscular walls and leads to their thickening. The varieties are scirrhus, encephaloid, and sarcoma. Cancer is rarely known during life. When it occurs there may be extension from the sternum or the mediastinum. Sometimes it follows cancer of the breast. Cancer.

*Parasites*.—Hydatids are very rare in England, but in Australia, where every form of hydatid disease is very common, the number of cases of hydatid of the heart is proportionately increased. The cyst may be imbedded in the substance of the muscular walls. It may merely lead to interference with the cardiac action, or to symptoms of suppuration, or to pericarditis from extension of inflamed cyst. Parasites.



Laceration of  
the heart

### LACERATION OF THE HEART.

No strain bursts a healthy heart; but laceration may follow myocarditis, aneurysm, or abscess.

Causes.

*Causes.*—Owing to accident or injury perforation of the muscular walls takes place. It occurs only in advanced life, is due to fatty degeneration of the muscular walls, or may result from disease of the coronary arteries, leading to defective nutrition of the walls of the heart.

Morbid  
anatomy.

*Morbid anatomy.*—Its most common *seat* is the floor of an aneurysm, and generally the left ventricle. Sometimes there is more than one rent. When the effusion is found in the pericardial cavity, it is partly serum and partly coagulated blood, and the heart is concealed under its pressure; it is empty, flattened, and wrinkled.

Symptoms.

*Symptoms.*—It invariably leads to death. In a few cases it leads to effusion of blood into the pericardium, which becomes distended, or the effusion becomes circumscribed, and the patient sinks gradually from pericarditis. In rare cases there is pain in the præcordia, a feeling of something giving way, patient gasps for breath, faints, and dies in a few minutes. In a few cases there is dyspnœa superadded, and patient rallies to some extent, but then passes into extreme collapse, with anxious face, cold extremities, profuse sweats, and sighing respiration, followed at the end of some hours by death.

### ANGINA PECTORIS.

Angina  
pectoris.

*Angina pectoris* means anguish of the breast, and is a rare paroxysmal disease, and may be due to causes which affect the circulation through the nervous system or may be muscular in character. It consists of a suffocative pain in the region of the heart and radiating thence. Such breast pains are also found in asthma, hysterical oppressions, in pleurisy, and often in consumption. The pains are dis-

tressing, both from their intensity and duration. With some the disease lasts for years ; with others the pains return periodically every night, or alternately with a headache. They have been called gouty, rheumatic, and spasmodic pains. They are not attended with any fever, and lead to no immediate dangerous consequences. It is called angina pectoris on account of its seat, the sense of strangling, and the anxiety with which it is attended.

*Causes.*—It may be sudden or due to ossification of the coronary arteries disordering the nutrition of the heart, or to fatty degeneration, or some valvular disease, to emotions with derangement of the stomach and heart. Advanced age and high living generally predispose to it. May be merely neuralgic, and may commence in the pneumogastric nerve and spread in different directions. Causes.]

*Post-mortem appearances.*—Valvular, especially aortic, disease is usually found after death, or ossification of the coronary arteries, or extensive atheroma of the aorta. The substance of the heart is always more or less degenerated. Post-mortem appearances.

*Symptoms.*—The affection is sudden. Patients are seized while they are walking, more especially if it be up hill, or soon after eating, with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life if it were to increase or to continue ; but the moment they stand still all this uneasiness vanishes. In all other respects the patients are at the beginning of this disorder perfectly well, and have even no shortness of breath. The pain is very intense, almost amounting to excruciating torture. It is often attended with a feeling of constriction across the chest and sense of suffocation and difficulty in breathing. The pain is often relieved after a deep inspiration. Pressure also relieves the pain. The pain is situated in the upper, middle, or the lower part of the sternum, and often more inclined to the left than to the right side, often shoots in various parts, Symptoms.

and may be felt in the left shoulder, back, side of the neck, and middle of left arm. With the attack the health also suffers considerably. The face looks pale and is covered with perspiration; pulse feeble, small, and fluttering. Very often the pulse is not disturbed by this pain. Males are most liable to this disease, especially such as have passed their fiftieth year. The expression is one of intense suffering; there may be derangement of the stomach and vomiting.

*Terminations.*—If no accident intervene but the disease goes on to its height, the patient suddenly falls down into a state of syncope, or becomes convulsed and dies, consciousness is unimpaired till the last. Usually, however, there are brief paroxysms with intermissions. The intermission is attended with great relief, and leaves the patient weak and exhausted for some time. After it has continued a year or more it will not cease so instantly upon standing still, as it did in the beginning, and it will come on not only when the persons are walking but even when they are lying down, especially if they be on the left side, and oblige them to rise up out of their beds. In severe cases it has been brought on by the motion of a horse or a carriage, by coughing, or straining at stool.

*Varieties.*—Some may be seized while they are first waking out of sleep, or while they are standing still, and the pain may reach even down to the hands; but this is rare. In long-standing cases the pain of each fit may last for some time.

Angina pectoris as a spasmodic complaint is known by the following symptoms:—1. The access and disappearance of the fit is sudden. 2. There are long intervals of perfect health. 3. Alcohol and opium give considerable relief. 4. It is increased by disturbance of the mind. 5. It continues for years without any other injury to health. 6. It is not at first brought on upon very slight

causes, as is usual in inflammatory diseases. 7. The pulse during the fit is not generally affected. 8. The attacks occur generally after the first sleep.

*Duration* of the pain rarely exceeds two or three minutes. Duration.  
In confirmed cases the paroxysms become more frequent and the interval shorter, from weeks or months to even days.

*Prognosis.*—Very serious. A form of angina known as Prognosis.  
pseudo-angina occurs among the young, characterised by sudden præcordial pain, disturbed breathing, faintness, giddiness, and feeble pulse. Occurs in the anæmic, but is seldom fatal.

*Treatment.*—Quiet, warmth, and alcohol help to restore Treatment.  
patients. Brandy, sedatives, and antispasmodics should be at once given to relieve the pain. Nitrite of amyl may be used, five drops for inhalation. Under it the duration and frequency of spasms are diminished. If due to any reflex irritation, as bad food, remove it by an emetic. For spasms stimulants internally and even chloroform inhalations may be tried. Locally frictions of stimulants and galvanism may be practised. During the interval a tranquil life, regular diet, avoidance of spirits, and attention to digestion and to the state of blood, are essential. Hygienic treatment should be scrupulously attended to, and hill exercise interdicted. For pseudo-angina the same treatment will serve.

### SYNCOPE. FAINTING. COLLAPSE.

Syncope.

This state is in many respects opposite to that of the fever, and attended with diminution of temperature. It is worthy of remark that in many cases of collapse the temperature is often many degrees above the normal; whereas there are cases of a general depression of temperature of the body without any collapse associated with it. The last is common during convalescence from fevers or during their remissions.



**Causes.**

*Causes.*—Fainting in women is largely under the control of the will. Lord Macaulay has noted that in the novel of “San Sebastiano,” the female characters fainted no less than twenty times. They always did it with a purpose, and in this the writer, who was a lady, showed an accurate knowledge of one part of feminine pathology. In most men fainting is a very serious indication.

*Exciting.*—Circumstances which lead to abnormal emptying of the cavities of the heart, as rupture of the heart or of great vessels, obstruction in the principal veins, or sudden removal of pressure from the great vessels, as operation of paracentesis for ovarian tumour; unwonted distension of urinary passages by stone or foreign bodies; want of an adequate supply of blood or the supply of impure blood to the substance of the heart, as blood containing urea; paralysis of the muscular fibres of the heart; degeneration of the heart from any cause. Various other causes act by producing a shock to the whole system, first disturbing the nervous centres. These are—a weak heart in various chronic diseases; sudden forcing back of blood in aortic regurgitation; strong mental emotions or depressions; severe burns; severe brain lesions; various exhausting discharges; severe blow to the pit of the stomach; sudden drinking of cold water when heated; irritants or poisons upon the stomach; lightning; angina pectoris; and pressure of pericardial effusion.

**Pathology.**

*Pathology.*—The depression of temperature is partly due to failure of proper circulation of blood in the parts exposed. The fall of the temperature of internal organs is chiefly due to the arrest of the disintegrating processes, and also of the vital processes upon which the integrity of the temperature is mainly due. The feeble circulation or failure of proper circulation of blood is due to cardiac debility, to diminished supply of blood to left cavities of the heart, and thence to the general circulation. It has been found

on post-mortem examinations that in these cases the right cavities of the heart are distended, those of the left side are contracted and empty.

*Post-mortem appearances.*—The heart is contracted and empty. If the walls are paralysed the cavities are dilated and contain coagula. The nervous system and the lungs are anæmic. Post-mortem appearances.

*Symptoms.*—When collapse is sudden and complete there is complete insensibility; the extremities are cold and pallid; the face pinched and shrunk; there is dilatation of the pupils; cold, clammy skin; slow, irregular, and weak or imperceptible pulse; respirations sighing, laborious, and irregular; noises in the ears; a feeling of compression about the chest, and confused mind. In some cases there is restlessness and delirium. Very often convulsions set in, and the sphincters act involuntarily. The heart beats extremely feeble, and there may be absence of impulse and sounds. In severe cases patient lies motionless, with eyes half closed and slightly twitching. There is a fall of temperature to about 92°. Collapse is a variety of syncope. Syncope is more severe, more rapid in its course, and is sudden in its onset. When gradual there is a sense of giddiness, trembling, and even faintness, sinking at the epigastrium, nausea and vomiting, the skin is cold and perspiring; in some cases shiverings occur or a sense of heat. The pulse becomes irregular, slow, and weak; the large arteries throb, breathing becomes gasping and irregular, and even hurried; there is restlessness, confusion of mind, and even disorder of special senses. These cases last a variable time, and either terminate in death or recovery. If recovery takes place there is more or less reaction, skin resumes its original colour and smoothness, circulation returns, and the temperature rises from 92° to 98·4°. Symptoms.

*Treatment.*—The cause must be sought for and removed. During the fit the patient should be put in a horizontal Treatment.

posture, with the head low. All clothes should be loosened and fresh air admitted. The vitality may be restored by dashing cold water on the face, by the application of ammonia or onion to the nostrils, mustard plaster to the heart and to the calves, and even rubbing of stimulating liniments or powdered ginger on the extremities. Stimulants internally may be given.

## ARTERIAL AND VENOUS OBSTRUCTIONS.

### EMBOLISM AND THROMBOSIS.

Embolism  
and  
Thrombosis.

Arterial and venous obstructions are frequent causes of many obscure diseases. May affect any organ, and present many groups of symptoms; are often related to putrid condition of blood, as pyæmia and puerperal fever.

Thrombus.  
Definition.

Thrombus signifies a clot of blood during life in the heart, arteries, or veins, in cerebral sinuses, and in portal system. It is a fibrinous clot, partially or completely closing the vessel at the seat of obstruction. It is most common in debilitated persons, and in those prostrated by such diseases as croup, diphtheria, and scarlet fever. In them the formation is favoured by the poor state of the blood.

Heart.

When in the *heart* it may be seated in the right auricles, the edges of the valves, muscular and tendinous cords of the ventricles, and between and behind the muscoli pectinati. It is carried from the heart along the current

Arteries.

of blood, and arrested in the *arterial* capillaries at their bifurcation or at their giving off of a large branch. The constant pressure from behind pushes it onwards, in consequence of which and of gradual coagulation of blood around it the vessel becomes occluded. When the thrombus

Veins.

exists in the *systemic veins* or right side of the heart it is carried onwards and ultimately fixed in the pulmonary arteries, and when in the pulmonary veins and left side of the heart or larger systemic arteries it is carried to the peripheries of arterial systemic circulation, that from the

veins of abdominal viscera is carried into *portal veins*. Portal system.  
Thrombosis is rare in pulmonary veins.

An *embolus* is a plug in an artery or vein, conveyed to it from a distance by the blood stream. Emboli usually are growths carried off from diseased cardiac valves, atheromatous plates from the aorta, or fibrinous deposits from growths or aneurysms. Emboli. Definition.

*Effects of thrombosis and embolus.*—In case of arterial capillaries the clot gives rise to local inflammation, and to partial or complete arterial or venous obstruction, leading to impairment of nutrition, followed by congestion, œdema, hæmorrhage, inflammation and its results, or to gangrene, softening, and atrophy. In case of veins it may be carried to remote vessels, or may set up local inflammation, or soften and form abscesses. Effects of thrombosis and embolus.

*Seat of thrombosis.*—Certain organs are especially liable to thrombosis. Thus, brain, liver, spleen, and kidneys, and lower extremities often suffer. In the brain the middle cerebral artery of the left side is most frequent. In them the obstruction produces serious effects. Seat of thrombosis.

*Morbid anatomy.*—In *thrombosis* the blood in the cavities of the heart is coagulated; the coagula also extend to the main arteries. Those in the cavities are black and jellylike; those in the arteries are moulded and decolorised. Some of them are laminated, as in aneurysms. The laminated coagula are of slow formation. *Causes.*—Coagula are common in advanced cases of heart or kidney diseases, also where patient has suffered for a long time from extremely feeble circulation before death. In such cases the heart failing to empty its cavity completely, blood remains stagnant in those portions which are distant from direct blood current, and coagulation is effected. The coagula also undergo degenerative changes. Morbid anatomy.

In the veins coagulation also occurs during life. *Causes.*—Where venous circulation has been enfeebled, as in phthisis



or carcinoma or other chronic or wasting diseases, and in the later stages of heart disease, coagulation occurs in trunk veins. Again, the walls of the veins are inflamed, and thus lead to coagulation and venous obstruction. Occasionally pus finds its way into the veins and causes coagulation. Thus, coagulation in veins occurs in erysipelas, carbuncles, pelvic cellulitis, inflammation in walls of parturient uterus, and in venous sinuses in diseases of internal ear.

The coagulation in veins when fresh only presents a central black cylinder and fresh blood deposits on it; those coagula which have occluded veins are generally laminated. Sometimes coagula adhere to walls of veins, and become converted into connective tissue, and thus close veins. Sometimes they undergo degeneration and form detritus, or soften and form abscesses.

Symptoms.

*Symptoms of thrombosis and embolism.*—Where the clot remains long it gives rise to inflammation of the vessel implicated and to complete obstruction to the passage of blood through it. If the affected vessel be superficial there is also pain and tenderness in the vessel. It may be remembered that obstruction of the pulmonary and systemic veins can generally be due to thrombosis only; the obstruction of systemic arteries and of portal veins may be due either to thrombosis or embolism. Thus, the presence of valvular disease on left side of the heart or the fact of previous rheumatism renders it probable that obstruction in systemic arteries is also due to embolism.

Thrombosis  
in the  
arteries.

*Thrombosis in the arteries.*—Thrombosis is always secondary, and is due to simple stagnation of blood and its coagulation. Thus, if an artery be ligatured or pressed by a tumour the whole pressed portion becomes the seat of thrombosis. In feeble circulation thrombosis also occurs. Diseases of coats, as atheroma, and syphilis, lead to coagula. Arteries of brain and lower extremities most suffer from thrombosis.

*Venous thrombosis* leads to stagnation of blood in the capillaries and to their dilatation, followed by distension of anastomotic veins and œdema. In veins.

*Varieties of thrombosis and embolus.*—*Phlegmasia dolens* is a particular case of thrombosis of the trunk veins of the limbs which become converted into painful rigid cords. Varieties of thrombosis and embolus.

*Cardiac thrombosis*, by interfering with the action of the valves, gives rise to murmurs. They embarrass the action of the heart and render it feeble. When clots exist in the heart, they are also found in arteries and veins, and hence lungs, kidneys, skin, and connective tissues, all share in the coagula.

*Obstruction of the pulmonary vessel.*—The smaller branches of the pulmonary artery are blocked up, and lead to pulmonary apoplexy, lobular pneumonia, gangrenous patches, &c.

*Obstruction of the systemic veins.*—Obstructs either the whole or only a part of the trunk of the pulmonary artery. The same occurs in coagula in parturient uterine veins. The sudden obstruction often leads to collapse or death by asphyxia or syncope. Symptoms in such cases often resemble those of angina pectoris or bursting of an aneurysm.

*Obstruction of large systemic arteries.*—Either from embolism or thrombosis, the arteries of the legs or the femorals, or even the abdominal aorta, become obstructed. This impedes the circulation of blood in the limbs, leads to cessation of pulsation in the vessels beyond, and pallor and coldness follow. If with obstruction the collateral circulation becomes established the condition of the limb again becomes normal. In ordinary cases the limb loses its temperature, the surface becomes pallid, and here and there mottled purplish spots or vesicles, and bullæ form. Gangrene is common.

*Treatment.*—In phlegmasia dolens keep the part at rest and the limb in an elevated and horizontal position. If the Treatment.

superficial vein be tender and seat of obstruction a few leeches will suffice. If œdema appears, wrap the limb in cotton wool to keep it warm. In cases affecting large systemic arteries keep the parts warm by wadding. Support the strength by nourishing food, stimulants, and tonics, and relieve pain by opiates.

## DISEASES OF THE GREAT VESSELS.

### ARTERITIS.

Arteritis.  
Definition.

*Arteritis* is an inflammation of the coats of the arteries. It may occur in each of the three tissues — External (tunica adventitia), middle (tunica media), and internal (tunica intima). Acute inflammation of the *external coat* is rare. It only occurs as secondary to extension of inflammation from the neighbouring part as the œsophagus, trachea, or the lymphatic glands. Inflammation of the *middle coat* is common in simple atrophy or fatty degeneration. The *internal coat* becomes affected in chronic inflammation, and is very common in advanced age; in gouty, rheumatic, syphilitic, and drunken persons, the inflammation occurs at points where there is greatest strain; also in cachectic persons it accompanies hypertrophy of the heart. External or *peri-arteritis* is characterised by pain and tenderness in the course of the affected artery, which is also hard and indurated. There is generally attendant inflammatory fever.

Post-mortem  
appearances.

*Post-mortem appearances.* — Whenever inflammation affects any organ the arteries supplying it also partake in the inflammatory process. When the inflammation affects the *external coat* it gives rise to congestion in the surrounding points, to indurated thickening of the coats from exudation, or to formation of pus between it and the neighbouring structures. Very often inflammation extends to the middle, and even to the internal coat, and gives rise

to their destruction by caries or necrosis. In severe cases all the tunics are affected, and perforation results. In such cases thrombosis is a common consequence. The artery is at first narrowed and afterwards widened. In inflammation of the middle coat there are red spots, which are elevated above the surface.

*Endoarteritis* is an inflammation which originates in the lining membrane, and remains limited to that membrane or involves other coats only by extension. Endoarteritis.

*Causes.*—Thrombus, or any irritating matter, or embolus, or excessive blood pressure, as in Bright's disease, are its causes. It may be due to poison or poverty of the blood. Syphilis also leads to it. Causes.

*Morbid appearances.*—The lining membrane becomes thickened and nodulated. The nodules are chiefly found at the point of bifurcation of the vessels. The inflammatory products undergo fatty metamorphosis or calcification. These degenerations in arteries are common with the advance of years, and are known by scattered yellow spots on their lining membrane. These deposits are fat globules, which often lead to disintegrations of the muscular fibres of the arteries. When degeneration takes place there is tendency for degenerated structures to break down, and be discharged into the circulation. Degeneration also gives rise to abrasions, ulcers, or cavities in the arteries. Very often fatty degeneration is associated with calcareous deposits in the tissues which intervene between fat cells. The calcareous matter often forms lumps or transparent plates, and often becomes detached, leaving ulcers behind. Very often arteries feel like rigid cylinders. The aorta is most subject to these degenerative changes. Morbid appearances

*Symptoms.*—The artery at the wrist is rigid; has lost its contractility and elasticity. The heart thus becomes hypertrophied, it having to overcome the increased resistance due to want of elasticity. Symptoms.



## ANEURYSM AND DILATATION.

Aneurysm  
and  
dilatation.

Definition.

The term *dilatation* is used to express a uniform enlargement of an artery for a considerable length. *Aneurysm* is an abrupt enlargement of a circumscribed tract, and when in the abdomen or thorax, it often attains a very large size, and leads to *visceral displacements*. If within the thorax to displacement of the heart, trachea, and large vessels. It also causes *pressure* on hollow tubes, as the cesophagus, trachea, or bronchi; it also very often compresses the lungs, and thus interferes with their functions. It has also a tendency to destroy by pressure *unyielding tissues* with which it may come in contact, as the bones of the chest wall or the bodies of the vertebræ are thus destroyed. It also sets up *irritation* and inflammation in the surrounding parts, which either end in adhesions, exudation, or suppuration. Very often an aneurysm presses upon the course of *nerves*, and even upon nerve ganglia, and gives rise to tingling sensations and pain, and also in the case of the *ganglia* it may lead to sensory paralysis.

Effects.

Visceral dis-  
placements.Pressure on  
organs.On unyielding  
tissues.Irritation and  
inflammationPressure on  
nerves.

Causes.

*Causes.*—Aneurysms are bulgings of arteries caused by increased pressure of blood. The bulgings may be due to weak state of the coats of the vessels, from the effects of accident or injury or from degenerations of its walls. When the blood pressure is greatly increased, as in Bright's disease, even the healthy portion of the arteries in the neighbourhood of the diseased part becomes considerably dilated. Where aneurysm occurs as a result of accident or injury its greatest frequency is found in those vessels which are most exposed to violence. Aneurysm generally begins by laceration of the middle coats of the artery, as by injury or degeneration, but very often atheromatous change without any lesion leads to aneurysm. It is a disease of adult life, and more common in males than females.

*Characters.*—Aneurysms may be globe-like or fusiform dilatations of artery in its whole width. In some cases several dilatations take place within a short distance of one another. They vary considerably in size ; those of the cerebral artery are rarely as large as a betel nut, while that of the aorta may reach to the size of a child's head. As an aneurysm enlarges the surrounding organs or tissues may become involved in it, and take a share in the formation of its walls, its true coats disappearing to a greater or less extent. The aneurysmal cavity may contain fluid blood or coagula, formed by slow deposition owing to roughness of the surface or to stagnation of blood.

Aneurysm.  
Forms.

When an aneurysm presses on the trunk or a main artery, it leads to obstruction and to improper supply of blood to the part which the artery supplies. When on a nerve centre, and if the pressure be sudden and complete, there will be immediate cessation of the motor and sensory functions of the part ; thus, in aneurysm pressing on the brain there will be sudden loss of consciousness and hemiplegia. In case of pressure on the nerves of the arm the pain is paroxysmal, and local paralysis results. Where the growth of aneurysm is gradual its pressure gives rise to anæmia, diminution of temperature, and deficient nutrition and function of the part supplied by the vessel, and it may lead to softening or gangrene. The pulsation in the parts beyond the seat of aneurysm will be weak or absent, and in the portion nearer the heart it will be increased.

*Symptoms.*—Are those of a simple tumour and those which depend on its relations with other parts. Thus it is a pulsating tumour, and pulsation is expansile like that of an artery ; when held between the fingers they are sensibly separated at each expansion. Where the aneurysm is filled with clots only no such expansion takes place, and there is only pulsation of a solid tumour as if placed over an artery. The pulsation is sometimes vibratile, and is associated with

Symptoms.

regurgitant aortic disease. Generally it is attended with a murmur corresponding to cardiac systole, which is of a blowing character.

Aortic  
pulsation.

*Aortic pulsation* is a functional disorder characterised by violent throbbing observed in the abdomen. It causes annoyance, and often produces sickness; in thin persons it may be seen and felt at the epigastrium, or at the umbilicus. It gives to the hand a jerking, quick, strong, forward impulse, and is synchronous with the pulse. Under the stethoscope we hear a systolic murmur, which may be due to anæmia or pressure of a tumour. In such cases remove the cause. The diet ought to be nourishing, and digestion should be improved.

Treatment.

#### ANEURYSM OF THE AORTA.

Aortic  
aneurysm.  
Definition.

*Aneurysm of the aorta* is a partial dilatation caused by a sudden strain or injury, or by disease of its walls, the inner coat becoming weakened or its elasticity lessened by atheroma, calcareous or fatty degenerations or syphilitic deposit. Is common in males, especially those subject to violent physical efforts. Uniform dilatation is not aneurysm. In aneurysm the aorta loses its elasticity at a circumscribed spot and becomes dilated by the pressure of the blood. It occurs in two forms—*circumscribed* and *diffused*. Diffused involves a considerable portion of the tube, and may be fusiform or cylindrical. Circumscribed—in this variety the artery is widened in all directions. The dilatation is limited; is attached by a neck.

Forms.

It is a disease of the middle and advanced period of life. Death usually takes place suddenly from rupture of the sac, or gradually from exhaustion or debility, brought about by repeated hæmorrhages. Aneurysm of the portion of the arch, embraced by pericardium, is always small in size and usually associated or confounded with valvular

disease. When of the portion beyond the pericardium, it attains a large size, displacing the lung if on the right side, and if anteriorly near the thoracic wall, it forms a visible pulsating tumour, and from results of pressure causes destruction of the sternum.

*Thoracic aneurysm.*—This disease is chiefly met with in different parts of the arch of the aorta, and in the roots of the large vessels arising from the arch. The first most frequent, is that from the convexity of the arch than from the concavity. When small and deep-seated they are not recognised, but when large they are recognised on the surface of the chest.

*Symptoms.*—Are those due to disturbance of circulation, to pressure on various neighbouring structures, and to interference with their functions. The pressure of an aneurysm, such as on the right side of the heart or on pulmonary artery will interfere with the supply of blood to the lungs, and cause venous congestion and dyspnœa, and dyspnœa is accompanied by a sort of whistling noise or coughing. The pressure on the main arteries, as the innominate and the left subclavian, causes obstruction to the general circulation, and alters the character of radial pulse. The pulse at the wrist is small, or none at all. Pressure on large veins, as the innominate or the vena azygos or superior vena cava, leads jugulars to swell, to venous congestion, œdema, enlargement of veins, and even to rupture, the dropsy being generally confined to the upper extremities and trunk. Pressure on air-tubes or lungs causes cough, dyspnœa, alterations in voice, and hæmoptysis. On the œsophagus to dysphagia and emaciation. Extreme emaciation shows pressure on the thoracic duct. Pressure on vagus or pulmonary plexus causes disturbed breathing and disturbed heart's action. On recurrent laryngeal, to dysphonia and laryngeal cough. On brachial plexus, to paralysis of the arm. In aneurysm of the *ascending arch* of the

Thoracic  
aneurysm.

Symptoms.

Aneurysm of  
ascending  
arch.



aorta. The effect of the pressure is to cause displacement of the heart downwards. The aneurysm also presses on the root of the right lung, the superior vena, the right innominate vein, recurrent laryngeal nerve, œsophagus, and gives rise to cyanosis, dropsy of upper half of the body, and intense dyspnœa. As the aneurysm progresses forwards and anteriorly there may be throbbing pain, with tenderness in the chest, and even corrosion or penetration of the thoracic parietes. If it passes backwards the pain may be gnawing owing to the destruction of the vertebræ. The patient looks extremely anxious, with a sallow cachectic look; he generally lies with the head high, and in a prone position, bending the head forwards, and then throwing it suddenly backwards. There is cough, dyspnœa, difficulty of swallowing, and occasionally permanent contraction of pupil by pressure on branches of the sympathetic. Occasionally patients expectorate blood for weeks or months before death.

Of transverse arch.

An aneurysm of the *transverse* arch, and that springing from its convexity, expands upwards to the left, and destroys the sternum, clavicle, left upper ribs, and rises from behind the sternum into the root of the neck. If it grows upwards and in front it attains a large size, and may eventually burst. The transverse arch presses upon the trachea and the lungs, and gives rise to dysphonia and irregularity of pulse. Externally aneurysms of the *descending aorta* are not detected until they attain a large size; may be suspected by dulness, pulsation, murmur, absence of respiration over a limited part, and dull, gnawing pain over the vertebræ, difficulty of deglutition, and dyspnœa.

Of descending aorta.

Physical signs.

*Physical signs.*—*Inspection.*—Local bulging in the site of the aorta. If the ascending or transverse portion be affected, the prominence will be in front opposite the upper part of the sternum. The swelling is generally conical. *Palpation.*—Pulsation is synchronous with the pulse at

the wrist, sometimes it may be double or more marked with the diastolic. The pulsation is usually expansile and throbbing. *Percussion*.—Dulness corresponds to bulging with increased resistance. *Auscultation* presents a bruit, a rough systolic murmur, occasionally diastolic, seldom double. Absence of respiration or bronchial respiration from pressure on a bronchus. There are signs of hypertrophy of the left ventricle. The pulse is delayed on one side.

*Diagnosis*.—It may be mistaken for a solid mediastinal tumour, for any consolidation at the left apex of the lung, for swelling over the sternum from an abscess, or peritonitis. It is necessary to remember that tumours having their seat over a healthy artery receive pulsation from it. Again, if such tumours cause pressure upon the aorta they may produce a murmur. We have, therefore, to make our diagnosis by considering the history, by noticing that aneurysms pulsate from the very first, and that they become hard and firm subsequently, that in aneurysms the size becomes diminished by gentle continued pressure.

Diagnosis.

*Abdominal aneurysm*.—Is more frequent above than below the celiac axis. They are of considerable size, and project from the anterior surface and sides downwards and to the left. *Inspection*.—A tumour is found just above the navel and to the left. On *palpation* a tumour forcibly pulsating can be felt a little after the apex beat. *Auscultation*.—Under the stethoscope a short, loud, bellows murmur will be heard accompanied with a thrill. The murmur is propagated into the iliac and femoral arteries.

Abdominal aneurysm.

*Symptoms*.—It often gives rise to acute pain in the back ; the pain may shoot in different directions, is increased by constipation, and often relieved by lying on the face. Pain in the belly, with vomiting, diarrhoea, or constipation, followed by general debility and palsy of the legs. Rupture gives rise to general peritonitis, jaundice, and suppression of urine.

Symptoms.

Treatment.

*Treatment of aortic aneurysm.*—Same as of cardiac disease. Disallow bodily and mental exertion. Give relief to the symptoms; give generous diet, and attend to the digestive and other functions. By rest, and diet taken in small quantity and at repeated intervals, the disease is often protracted, and a cure is sometimes obtained. Our endeavour ought to be to palliate the symptoms as they arise. The pain and depression may be relieved by sedatives and stimulants. Some recommend iodide of potassium in these cases, but its effects are not certain. Many operative procedures may be had recourse to, such as injection of perchloride of iron or ergotine into the sac, galvano-puncture with a view to coagulate the blood and, by mechanical action of needles, to decompose water and salts of blood, and deligation of the artery at its distal end.

Diseases of  
the digestive  
organs.

## DISEASES OF THE DIGESTIVE ORGANS.

These affections reveal clinically the state of the system in general and of the alimentary canal in particular. They give rise to:—1. Altered taste. 2. Changes in the various movements in the mouth. 3. Changes in the quantity and quality of the secretions. 4. A fetid odour of the breath. 5. Morbid structures of the parts affected and of the glands in their neighbourhood.

### INFLAMMATION OF THE MOUTH.

Stomatitis.

#### STOMATITIS.

It is a common disease in children. It affects the mucous follicles of the mouth and the tissues of the cheek and also the gums. Diseases of the mouth include sore throat, glossitis, and mumps.

*Sore mouth* may be the result of one or more of a variety

of pathological changes. Though the causes are various, the main symptoms, so far as the patient's sensations are concerned, are the same and are indicated by the heading. Aural catarrh is an accompaniment of most kinds of sore mouth. It also occurs simply, although in the adult it seldom is so severe as to amount to soreness; in the infant it causes so much distress that it may be included in this division. The pathological causes of sore mouth are:—

1. Simple or catarrhal stomatitis.
2. Croupous or aphthous stomatitis.
3. Diphtheritic stomatitis.
4. Excoriations and ulcers.
5. Syphilitic affections.
6. Scorbutic affections.
7. Thrush or parasitic stomatitis.
8. Glossitis.
9. Gangrenous (cancrum oris) sore mouth.
10. Mercurial (ptyalism) stomatitis.
11. Parotitis.

### CATARRHAL STOMATITIS.

#### ORAL CATARRH.

Oral catarrh.

*Causes.*—Is rarely induced by exposure to cold. In young children and those in whom the hygienic laws have been neglected; those who have been brought up by hand or fed on artificial food, or suckled too long; those who have come into the world before the full period or are born of poor, or syphilitic, or cachectic parents. In them the irritations which act on the mucous membrane are dentition, rough teeth, and mercury. 1. Propagation from neighbouring organs, as in erysipelas of face and inflammation of fauces, and acute and chronic catarrh of the stomach. 2. A symptom of constitutional affection, as in typhus and scarlatina, poverty, or poison in the blood, as induced by mercury, malaria, and phthisis. 3. Contagion, as in children with thrush. 4. Unknown causes, as sitting up at night.

*Morbid anatomy.*—The mucous membrane of the mouth is affected by catarrh exactly as other mucous membranes

Morbid  
anatomy.



are. It is hyperæmic, dark, red, and dry, or swollen, and infiltrated with exudations. The secretion is scanty at first and the membrane is dry and swollen. Soon the discharge is abundant, and contains young cells, and is then watery and acrid, and the mucous membrane is clouded, and the swelling also diminishes. The swelling is most evident at the edges of the tongue, and inside the cheeks. The tongue is moulded on the teeth; the young cells stick on filiform papulæ making a coated tongue. In *chronic* oral catarrh the appearances are similar. As the case progresses the secretion becomes thick and purulent. In favourable cases the swelling subsides, and the discharge becomes healthy, and the parts return to their normal state. The disease often commences with a small patch, and soon extends from the mouth to the nose, or to the pharynx, or to the larynx; may attack the fauces, the soft palate or the gums.

Symptoms.

*Symptoms.*—It often extends to the nasal cavities, and to the air passages, or to the eye, or to the ear. It commences with a small bright red patch in the inside of the cheeks, gradually extending and affecting the whole of the mucous membrane. The surface is dry at first, but is soon covered with profuse secretion; the mucous membrane is swollen and here and there covered with excoriations or ulcers. The teeth are loose. There is burning sensation, and unpleasant taste in the mouth, the breath is offensive; pain, swelling, and tenderness of gums, and particularly of the periostium of the sockets of the teeth; there is a feeling of slimy substance on the mucous membrane, and derangement of the alimentary canal. Children are restless and sleepless, and cry, and may have convulsions. There are also febrile symptoms, as elevation of temperature, dryness of the skin during the day, and profuse perspiration at night. The pulse is frequent, and there is great thirst, scanty urine, and sometimes drowsiness.

Diagnosis.

*Diagnosis.*—In health, on the back of the tongue in the

morning, there is usually a coating of dry epithelium. White papillæ of the tongue in fever is merely due to dryness from loss of moisture. In oral catarrh there is swelling and moisture of the mucous membrane.

*Prognosis.*—Convulsions or spasms during dentition are sometimes dangerous to life. Prognosis as to cure is doubtful in chronic cases. Prognosis.

*Treatment.*—The patient should be confined to bed in a warm and well-ventilated room. Should have an anodyne at bedtime to procure sleep. Relieve the pain and discomfort, and excite perspiration by diaphoretics. Look to the teeth, and if due to mercurials, discontinue their use. Chewing pieces of rhubarb before going to bed and a gargle of soda water are useful. If these remedies fail, pencil the mouth over with solution of nitrate of silver, two grains to one ounce of water. Treatment.

### CROUPOUS STOMATITIS OR APHTHÆ.

Croupous  
stomatitis.

*Causes.*—Often occur in ill-nourished children and in measles ; is also caused by cutting teeth ; may occasionally occur as small epidemics. Causes.

*Anatomical appearances.*—The inflammation is chiefly confined to the anterior half of the tongue, and to the inner surface of lips and cheeks, and hard palate ; there is catarrh of the rest of the mouth. On opening the mouth the back of the tongue is stiff and sore, and we find cracks or fissures, or small whitish spots with a red border on the lips, cheeks, and edges of the tongue, which often coalesce together. They are not vesicles, but solid excoriations under the epithelium. These when thrown off leave superficial ulcers. The ulcers readily heal, leaving no mark or cicatrix. If the spots are punctured no fluid exudes ; the spots are, therefore, not what they look like, vesicles. Anatomical  
appearances.

*Symptoms.*—The child is unable to suck on account of pain, saliva flows profusely from the mouth, the mouth is offensive. Eruption often precedes febrile phenomena, and restlessness, with frequent vomiting, and diarrhœa, occurs.

*Treatment.*—Chlorate of potash from four to six grains for a dose is said to be a specific in aphthæ.

Diphtheritic  
or  
ulcerative  
stomatitis.

### DIPHThERITIC OR ULCERATIVE STOMATITIS

Is an affection common in children, and it closely resembles parasitic stomatitis and an early stage of gangrenous sore mouth.

*Causes.*—Long-continued use of mercury; all those circumstances which lead to malnutrition. Probably extension by contagion is the cause of excoriated patches. They are seated over the dorsum, or side of the tongue, inside the cheek, on the surface of the gums, on the palate, and on the surface of the buccal mucous membrane. The ulcers are irregular in size and shape, often run into one another, their surface is red and covered with serous fluid, sometimes bloody; and are surrounded by thick and opaque mucous membrane. The tongue is covered with a thick fur, and looks like wash-leather.

*Symptoms.*—There is slight feverishness at first, followed by soreness in the mouth, difficulty in swallowing, and severe pain on chewing and speaking. On examining the mouth there are seen ulcers in different parts. Besides fever there is restlessness and drowsiness, great thirst, and loss of appetite. The disease subsides within a week. Is often accompanied by a diphtheritic form of mercurial stomatitis; the salivary and mucous secretions are enormously increased; the pillow is saturated by running saliva. There is thick, yellow, soft coating at the edges of the teeth and elsewhere. The cure is slow.

*Treatment.*—The fever may be reduced by cold drinks ; Treatment.  
 attention must be paid to the condition of general health.  
 Locally apply borax or chlorate of potash into the mouth,  
 to the tongue, and soft palate. In mercurial diphtheritic  
 stomatitis the patient will get well on the eighth or ninth  
 day. Paint the ulcers with nitrate of silver. For a child  
 under one year give twenty grains of chlorate of potash in  
 six ounces of water, and of this two drams may be given  
 three times a day ; Condyl's fluid is useful to relieve fœtor.  
 Health must be improved by tonics, generous diet, and  
 stimulants ; also give iodide of potassium.

### EXCORIATIONS AND ULCERS.

Excoriations  
and ulcers.

*Causes.*—Small ulcers on the tongue may be caused by Causes.  
 local injury. Diffuse catarrhal ulcers in the mucous  
 membrane are very rare. Follicular ulcers from the  
 stoppage, swelling, or ulceration of the buccal glands  
 often occur. These ulcers are often present at the  
 menstrual period, and affect the angle of the jaw. Herpetic  
 vesicles may lead to ulcers. The ulcers are sometimes Anatomical  
appearances.  
 limited and epithelial, and sometimes diffuse on the  
 mucous membrane. In the *follicular* variety the edges  
 are hard and red. *Variolous* occurs in smallpox pustules,  
 affect chiefly the roof of the mouth, and on bursting leave  
 ulcers. *Scorbutic* are due to scorbutic diathesis. *Can-*  
*cerous* occurs in persons suffering from cancerous cachexia.

*Symptoms.*—Are very annoying, but are not dangerous. Symptoms.  
 An ulcer begins as a red border on the upper margin of  
 the gums, where they join the teeth. The gums soon  
 swell, become dark blue, and their pointed processes  
 between the teeth then swell out ; they soon slough, and on  
 separating leave ulcers. These often heal, leaving a mark  
 or cicatrix. The ulcers are often limited to one side.



They render chewing painful, and even impossible. There is increased secretion of mucus and saliva, foetid odour, and swelling of the tongue and salivary glands.

Treatment.

*Treatment.*—Locally painting them with nitrate of silver is the best remedy. Chlorate of potash is not so useful in this malady.

Syphilitic affections.

### SYPHILITIC AFFECTIONS.

Primary ulcers in the mouth and condylomata are not very common. A syphilitic nurse gets the disease while nursing and gives it to the child. In cases of constitutional syphilis gummy tumours and nodular syphilomata occur from circumscribed induration or from syphilomatous papules. At first the excessive cloudiness of the epithelium of the mouth gives it a white appearance. Subsequently the papules on the mucous membrane form syphilitic erosions by molecular disintegration or condylomata by papillary proliferation or by both. The ulcers are often seated at the angles of the mouth, and on edges of ulcers usually small condylomata are seen. The ulcers on the tongue form fissures, with deep white-grey base, and are uneven. On the lateral edges of the tongue are elongated condylomata. They are shallow on the dorsum, and often oval and warty. The gummy tumours generate on the anterior third of the tongue; and after rupture of a nodule a sharply bounded ulcer is left with inverted, thickened borders.

Diagnosis.

*Diagnosis* rests chiefly on the history. They occur at the angle of the mouth, and recede and come again. The ulcers are very sensitive.

Treatment.

*Treatment.*—Of syphilis generally.—Mercurial treatment cures them rapidly.

## SCORBUTIC AFFECTIONS.

Scorbutic  
affections.

Affection of the gums is one of the first symptoms of scurvy.

*Anatomical appearances.*—The gums are spongy and livid where they join the teeth. Where there are no teeth the gums are free. The affection is sometimes limited to one side. At first we find a red border on the upper margin of the gums, and gums swell and become dark blue, and pointed processes between the teeth especially swell out. The swelling depends upon œdema and the escape of blood into the parenchyma of the gums. It may be so great as to cover the teeth. This often becomes of a discoloured mass, and slowly sloughs and leaves cicatrices.

Anatomical  
appearances.

*Symptoms.*—Chewing is painful or even impossible. The secretion of mucus or of saliva is increased. There is a bad odour in the breath.

Symptoms.

*Treatment* consists of astringent washes, as of decoction of cinchona, myrrh, rhatany, and oak bark.

Treatment.

## PARASITIC OR FUNGUS STOMATITIS.

Parasitic  
stomatitis.

## THRUSH.

Occurs in children during the first days of life. In adults in protracted diseases it occurs shortly before death. Probably fungus grows when chewing is not energetic. Neglect of cleaning the mouth favours its production. It is not necessarily contagious.

*Morbid appearances.*—The disease commences at any part of the buccal surface; occurs in the sulci between the gums and alveoli of teeth; chiefly noticed in the lower jaw. Begins with an ulcer or as a superficial slough; sometimes with thickening, tension, and congestion of the cheek; sometimes as white points or a cheesy mass. At first it can be readily removed, afterwards it becomes more

Morbid  
appearances.

firmly attached. It consists of young and old epithelium cells, with fat globules and spores. The spores are oval, with filaments forming tree-shaped figures. The disease soon runs on to an irregular greyish or black slough on the mucous membrane of the mouth. The slough is surrounded by a red or somewhat livid rim of congestion. The disease spreads very rapidly in extent and depth, and gives rise to infiltration, thickening of the cheeks in the neighbourhood, which soon appear tense, shining, and livid. The disease involves the teeth, a portion of the jaw comes away necrosed, and the soft palate, fauces, and tongue, are all more or less destroyed; often the cheek becomes perforated.

Symptoms.

*Symptoms—Objective.*—'There are small, round, opaque, white elevated patches over the tongue, gums, inside of lips, cheek, soft palate, and the mucous membrane of the mouth, often extending to the mucous membrane of the stomach. The patches look like clots of curdled milk, and can easily be detached. They are probably vesicular growths. Under the microscope the patches consist of epithelium, fat, and sporules of fungus, known as *oïdium albicans*.  
*Subjective.*—'The mouth is sore, dry, burning, and painful during nursing; there is slight fever, with derangement of the stomach; and diarrhœa with green acid stools. When it occurs in children it is generally associated with some acute specific fever, and is favorable, but when it occurs in adults it is often associated with phthisis and other chronic diseases, and in them it is the harbinger of death.

Treatment.

*Treatment.*—Improve the state of general health, and attend to the condition of the stomach and bowels. In children vomiting may be allayed by lime-water and milk, and bowels should be regulated by alteratives. Locally, prevent any milk being left in the mouth; apply alum, borax, sulphate of zinc, or nitrate of silver, to the inside of the mouth. Some recommend sulphurous acid as a remedy to destroy the fungus.

## INFLAMMATION OF THE TONGUE.

## GLOSSITIS.

Glossitis.

It is an exudation between the muscular filaments of the tongue, and may be acute or chronic.

*Causes.*—Acute may be due to direct injury, as contact of boiling liquid, burns, or stings. It may be idiopathic, or may take place under the influence of mercurial poisoning. Chronic occurs from pressure of sharp edges of teeth and pipe stems.

Causes.

*Anatomical appearances.*—The disease sometimes affects one side. Generally the whole tongue is enlarged and indented by teeth, the surface is dark, and covered with tough and often bloody exudations. Its substance is infiltrated, soft, and pale. Sometimes it regains its natural size, or it remains for a long time large and indurated. In chronic cases the glossitis is partial, and especially at the edges of the tongue there are circumscribed hard spots, and at these points the muscular tissue is replaced by connective tissue. In glossitis due to burns the tongue's surface is divided into lobules by furrows, and the remains of the food collect in these and cause ulceration. In superficial glossitis the mucous membrane is thickened, rigid, and cracked, and the whole tongue looks varnished.

Anatomical appearances.

*Symptoms.*—The mouth is kept open by an enlarged tongue. The acute cases are attended with fever and sometimes with rigors. There is a great deal of burning pain and tenderness of the tongue when touched. Speech, chewing, and even swallowing become impossible. The tongue being enlarged saliva accumulates in the mouth and often runs out. The submaxillary and lymphatic glands are also enlarged; there is profuse saliva and fœtid breath. The pressure of the tongue upon the larynx seriously impedes respiration; its pressure upon the jugular veins leads to obstructed circulation, and the face becomes

Symptoms.



livid, blue, and swollen. Death takes place by suffocation. The disease lasts for about a week or ten days. Chronic glossitis is often mistaken for cancer.

Treatment.

*Treatment.*—In acute cases subdue the inflammation by scarifying the tongue deep at once. The cause must be sought for and promptly removed. In mild cases keep the tongue moist by ice constantly given to suck. As the patient cannot swallow give food by nutrient enemata. If suffocation be imminent relieve it by tracheotomy. Locally keep the tongue clean by antiseptic lotions. Often fomentations or leeches externally to the throat may be beneficial. The pain is relieved by opium. In chronic cases see to the teeth. For cracks and fissures touch them with nitrate of silver, and wash the mouth with carbolic acid lotion.

### GANGRENOUS STOMATITIS.

Gangrenous  
stomatitis.

*Gangrenous stomatitis noma* or *cancrum oris* is a gangrene of the mouth due to inflammation in a debilitated person; occurs generally in cachectic children, often after measles; rarely after typhus and pneumonia. Is a dangerous affection limited to children between one and three years.

Morbid  
appearances.

*Morbid anatomy.*—Commences on the inside of the cheek over a spot hardened by infiltration. The mucous membrane becomes red and discoloured, and a circumscribed œdematous swelling and a vesicle often rises upon it. The point over the vesicle is black, and is soon covered with a slough, which on separating leaves an ulcer. The vesicle rapidly spreads over the cheek, lips, gums, and even over half the face; the skin over it becomes tense, hot, shining, and the vesicle either bursts, leaving a large ulcer, or the entire cheek is soon converted into gangrene. When the slough separates the teeth often fall out, the bones

become exposed, and even necrosed. The gangrene instead of spreading often causes a mere hole in the cheek.

*Symptoms.*—While the gangrene begins inside there is a circumscribed œdema of the outside of the cheek and lips. A hard rounded nucleus is formed in the centre of that over which the skin is shining, pale, and mottled white. The surface is generally pale and cool. The pulse is small, rather frequent, and the patient is little affected in spirits. On the fifth or sixth day a black slough may form, which increases till it affects half the face. Pain may be slight, or absent in the affected part. There is profuse flow of saliva mixed with blood, or with gangrenous discharges, and horrid fœtor of the breath. Even at this stage the patient is strong, but soon becomes extremely prostrated. Often delirium or drowsiness sets in, ending in death from asthenia in a few days. If recovery takes place it leaves a deformity. Symptoms.

*Treatment.*—Attention must be paid to maintain health and strength. A light, liquid, but nutritious diet with alcohol is essential. The patient should also have other diffusible stimulants. For the relief of pain and discomfort opium is highly beneficial. Locally the mouth should be very frequently gargled with astringent and antiseptic washes, such as of Liquor Sodæ Chlorinatæ, permanganate of potash, hydrochloric acid, or chlorine. Poultices should be applied externally, and to the gangrenous sore apply freely nitric acid or the actual cautery. Treatment.

## MERCURIAL STOMATITIS.

Mercurial  
stomatitis.

### PTYALISM.

*Ptyalism* is an increased salivary secretion. The normal quantity of saliva in twenty-four hours is ten to twelve ounces. Disease occurs when the saliva increases in Definition.

quantity, ceases to pass into the stomach, and makes its secretion uncomfortable. At the beginning the secretion is not saliva but mucus, with shreds of epithelium from the aural mucous membrane.

*Causes.*

*Causes.*—Irritation of the mucous membrane of the mouth and fauces, or of the glosso-pharyngeal and lingual nerves, by mercury or iodine, or other vegetable substances. Irritation of gastric and intestinal mucous membrane or of the uterus, owing to reflex irritation from gastric nerves, mental influences, and nervous diseases. Some persons have obstinate salivation without any apparent cause. In insane and old folks the flow is great, because they do not swallow it. It also occurs in typhus.

*Symptoms.*

*Symptoms—Objective.*—The gums and lingual mucous membrane are very tender, bleed on the slightest touch, and are even ulcerated and gangrenous. *Subjective.*—There is generally no pain, or, if pain be present, it is due to the accompanying stomatitis. The saliva is increased; it may be increased from six to eight pounds; its specific gravity is high, and it contains albumen and chlorides. Under microscope we find some mucous cells with numerous epithelium cells. In long-continued cases the patient emaciates, partly because an excess of stomatitis makes chewing painful, and also because the excess of saliva passes into the stomach and interferes with digestion. The breath has a peculiar metallic odour; the patient is obliged to spit constantly; and there is no rest at night on account of the saliva constantly flowing out.

*Diagnosis.*

*Diagnosis.*—As aphthæ and ulcers coexist with mercurial stomatitis, it may be mistaken for thrush. In thrush in children there is no sponginess or bleeding from the gums, no fœtid breath, and under the microscope we find a fungus called *oidium albicans*.

*Treatment.*

*Treatment.*—Treat the cause. Slight laxatives are useful. Improve the condition of the stomach and intestines.

Baths, gargles of alum, sulphate of zinc, oak bark, and decoction of cinchona, are recommended. Opium is the best remedy. Some cases defy all treatment.

### PAROTITIS, OR MUMPS.

*Parotitis*, otherwise called *Cynanche parotidis*.—Is an Parotitis. acute specific inflammation of the parotid, and sometimes of the submaxillary and salivary glands. The disease is probably contagious, and also epidemic, occurs but once in life, has a tendency to metastasis to testicles in males, and to mammæ or ovaries in females. The disease is said to be due to blood poison.

*Causes*.—Is a disease of childhood, most frequent Causes. between seven and fifteen years; rare in adults. It is most common in cold and damp weather. Infants and old persons generally escape. As a sympathetic affection quinsy (angina) results from severe diseases, as typhus, a very unpleasant and undesirable complication.

*Pathology*.—In idiopathic cases the anatomical changes Pathology. are unknown, as the course of the disease is generally favorable. It may be chiefly caused by serous exudation, infiltration, and suppuration. Sympathetic begins with hyperæmia, causing the gland to appear swelled; a tough purulent substance collects in the ducts, and lobules soften and break down so as to become cavities containing pus. Next the true coat is destroyed, and interstitial tissue begins to suppurate; this may extend, and a large parotid abscess may form. The inflammation may spread and destroy surrounding tissues, and thrombosis with phlebitis of neighbouring veins may be caused.

*Symptoms*.—The symptoms of mumps do not differ from Symptoms. those of quinsy, but are less violent; the treatment is also alike.

*Termination of mumps*.—Metastasis is very common. Termination.



Sometimes a testis is affected at the same time. The scrotum is œdematous, inelastic, and there is some serous exudation into the tunica vaginalis. This does not run a clear course, but flags and exacerbates. Sometimes in women a breast is affected.

### MORBID GROWTHS.

Morbid  
growths.

Tubercles.

*Tubercles.*—There is a tuberculous angina faucium which extends to the soft palate, but with this exception, the mouth itself is not attacked with tubercles.

Syphilis.

*Syphilitic growths.*—Syphilis is often manifested in the mouth. Erythematous patches are commonly seen on the inside of the lips and cheeks, along with skin eruptions. Mucous tubercles are also met with during the same epoch on the edges and dorsum of the tongue, and also on the tonsils. Shallow ulcers are not rare. Gummata may also be found in the substance of the tongue.

Malignant  
tumours.

*Malignant tumours* affect the lips and tongue. In persons in advanced life epithelioma of the lower lip is common. These tumours are generally primary affections, when they occur they are of very small growth; they invade the surrounding structures, and cause their destruction, and lead to ulcerations and sloughing, they implicate the neighbouring glands, and emit a very foetid discharge. *Diagnosis* is best made by microscopical examinations. *Symptoms* are those of cancerous cachexia, of emaciation, and loss of appetite. The *treatment* is to relieve the pain and support the strength. Surgical interference may be required.

Quinsy.

### QUINSY. ANGINA.

The English word quinsy is derived from the Greek Sycanche and Kynanche. Quinsy is a name used for all acute disorders of the upper region of swallowing, which

directly prevent or render painful that act. Such may affect the most forward of the parts used in swallowing, as the root of the tongue, or they may attack the fauces, or the upper part of the pharynx.

*Causes.*—These disorders are all of them inflammatory in their nature, and all have a tendency to end in suppuration. All seem idiopathic. As an acute disorder it is perhaps the rarest. Cases of inflammatory swelling of the tongue are not rare; they are due to some traumatic cause, or to inflammation spreading from a pre-existing abscess. Cases ending in suppuration are somewhat more common, but difficult to diagnose, as similar symptoms are often caused by abscesses connected with disease of the bodies of the cervical vertebræ. The sudden onset, short duration, and rapid termination show it to be a case of acute inflammation ending in suppuration. Causes.

*Symptoms.*—It is always a painful distressing disorder. Its onset is often tremendous, and it advances with all the fury of the most dangerous fevers. The temperature is raised to 104°, perhaps to 106°; the pulse is rapid in proportion; the patient's face is flushed; the tongue is furred, and may be dry. There are pains in the loins, vomiting, and severe frontal headache. Smallpox, pneumonia, typhus fever, typhoid fever, and acute tuberculosis are perhaps suggested to anxious interpreters of the symptoms. The next day the patient cannot swallow. The tonsils and uvula are seen to be greatly enlarged, the latter is often adherent to one of the tonsils. The fever abates, but does not pass on till resolution or suppuration takes place. It ought to be remembered that the enlargement, as well when it is acute as when it is chronic, may cause deafness. This gives rise to a seeming dulness on the part of the patient, which combined with the headache and high temperature makes the attack look very much Symptoms.

like the beginning of some grave fever. In most, if not in all cases, the bowels have been confined for some days. The quinsy is often relieved by purging. Still constipation cannot be taken as a cause of swelled throat, for in the prolonged constipation of chronic lead poisoning, enlargement of the tonsils is not found.

Diagnosis.

*Diagnosis.*—It must be borne in mind that not only scarlatina, but typhoid fever and acute rheumatism are often attended with slight sore throat. The prevalence of scarlet fever and the appearance of rash include quinsy. In typhoid fever, if there be the slightest doubt, we must withhold the purge till the thermometer has assured us that the lesser disease is present. The temperature is in some degree dependent on constipation, for in all cases, however ending, which have been freely purged, the temperature is less high. However large the tonsils dyspnœa is rare.

Duration.

*Duration.*—The attack ends within a week.

Prognosis.

*Prognosis.*—Is favorable. It terminates in resolution, or in suppuration, after which the surface heals rapidly.

In secondary cases the patient is already too ill to complain. It is sometimes preceded by slight rigors. More often fluctuation comes to be felt. The pus may open in the ear, pharynx, or may burrow.

Treatment.

*Treatment.*—The patient should be kept well protected from draughts. Give nutritious diet and enjoin rest. If the pain shoot up to the ear and down the neck it may be relieved by fomentations, stimulant liniments, followed by poultices or only water dressings. External applications rarely cause resolution; leeches, therefore, are to be avoided. Purges of senna with a low diet till the inflammation subsides, sum up all that need be done. Gargles are more painful than useful. Dover's powder at night while there is pain, and after resolution or suppuration decoction of bark, are the only other remedies to be recommended.

## TONSILLITIS.

Tonsillitis.

The term tonsillitis is sometimes applied to that form of quinsy in which the tonsils only are affected. The tonsils are liable to be more or less affected in inflammations of the mouth and fauces. As an idiopathic affection it is often associated with scarlet fever and diphtheria.

*Causes.*—The disease is often idiopathic, and may be due to exposure to wet and cold. The disease most commonly affects children, and if once developed it is apt to lead to frequent relapses. Causes.

*Morbid appearances.*—There is swelling of the tonsils, of neighbouring parts of the throat, and of base of the tongue. Generally one tonsil is alone affected. In many cases the affection attacks one tonsil at first, and the disease then extends to the other. The tonsil is enlarged, congested, and also infiltrated with inflammatory exudations. The surface is covered with whitish-looking opaque pellets of superabundant epithelium, which accumulates in the orifices of its crypts. The substance of the tonsil becomes nodulated, and the nodules often suppurate and even run together. In many cases abscess is formed. With the enlarged tonsils the soft palate is pushed downwards, forwards, and inwards, the anterior pillar of the fauces is also displaced, and both form a tense swelling with the convexity forwards. When both tonsils are enlarged they meet in the median line, sometimes become ulcerated by mutual pressure, and often close the fauces; the uvula is also swollen, tense, pendulous, and often clings to one of the tonsils. Sometimes the salivary glands in the neighbourhood are also swollen and enlarged. Morbid appearances.

*Symptoms.*—The patient complains of chills or rigors followed by fever; and has soreness, tingling, and dryness of the fauces. The temperature often rises to 102° or 105°. The pulse increases to 108 or 120, and is full and firm. Symptoms.



The skin is hot and often moistened with sweat. There is headache, loss of appetite, great thirst, urine scanty, and bowels constipated. There is great pain on moving the jaw, or on attempting to swallow. There is profuse discharge of viscid saliva, and fluid returns through the nostrils. The voice is nasal. There is often deafness, and restlessness and sleeplessness at nights.

**Duration.** *Duration.*—The disease runs its course in three or four days, and convalescence is established within a week. It often terminates in an abscess, which bursts and discharges foetid pus.

**Treatment.** *Treatment.*—The disease generally takes its own course, but still appropriate measures are necessary. Perfect rest; liquid and nutritious diet are essential. Subdue the inflammation by a few leeches in the neighbourhood of the tonsils. Very often hot fomentations, and linseed or mustard poultices to the throat, or a steam of hot vapour, or anodyne vapour directed to the fauces give relief. The sucking of ice in many cases does good. Astringent gargles, and even the application of nitrate of silver are recommended. Tincture of guaiacum given in ounce doses every three or four hours has a desired effect. Should the tonsils suppurate, the abscess may be allowed to burst, or opened by a scalpel with care.

**Chronic tonsillitis.** *Chronic tonsillitis.*—Very often inflammation of the tonsils terminates in induration or gradual hypertrophy, forming indolent tumours. They may also be due to chronic inflammation. The enlargement, if very great, diminishes the size of the canal of the fauces, and may even block it up altogether. In many cases the enlargement is not known to the patient; if considerable the voice becomes peculiarly thick, and often there is deafness. On examining the throat there is chronic thickening of the mucous membrane of the pharynx, and of the Eustachian tubes. In such cases the application of a strong solution of

nitrate of silver promotes the disappearance of these bodies. The general health must be improved by tonics, good nourishing diet, and free exercise in the open air. The excision of the tonsils, their actual cauterisation, or the application of the acid nitrate of mercury ointment may be practised with advantage.

## DISEASES OF THE THROAT.

Diseases of the throat.

These are extremely common affections, and have a common clinical reference objectively to—1. A peculiar sensation in the throat. 2. Difficult or painful deglutition. 3. Changes in the tone and intensity of voice. 4. Peculiar cough. 5. Oppressed breathing or suffocation. 6. Breath of a foetid odour. 7. Hearing defective or absent.

*Subjectively* to—1. Internal appearance of the throat, red or covered with patches of exudation. 3. Presence of morbid growths, and various alterations in the condition of the pharynx, soft palate, uvula, tonsils, &c.

The diseases are classified as—1. Catarrhal inflammation of the fauces and pharynx, otherwise called pharyngeal catarrh. 2. Croupous. 3. Diphtheritic. 4. Phlegmonous. 5. Syphilitic pharyngitis. 6. Retro-pharyngeal abscess. 7 and 8. Cancer and stricture of pharynx.

Classification.

## ACUTE PHARYNGEAL CATARRH.

Acute pharyngeal catarrh.

It may be acute or chronic. Acute is otherwise called diffuse erysipelatous inflammation of the pharynx; the soft palate being included in the term pharynx.

*Causes.*—Predisposition varies. Some persons if exposed to the slightest injurious influence are attacked. Some have it several times a year. Is common in the young and in those whose health is reduced, as by syphilis, excesses, and intemperance. *Exciting causes.*—Direct irri-

Causes.

tation to the throat, as from hot or corrosive substances, fish bones, alcohol, &c. 2. Exposure to draughts of cold air, leading to general catarrh. 3. Propagation of inflammation from the neighbouring parts. 4. Poison in the blood, as of scarlatina or constitutional syphilis. 5. Any poison mixed with the air we breathe. 6. Epidemic.

Anatomical  
appearances.

*Anatomical appearances.*—If acute the mucous membrane of the throat is of a dark red colour and thick; the submucous tissue near the uvula is swollen, and tonsils are enlarged. The mucous surface is dry and glistening at first, but soon becomes covered with a cloudy secretion; as is most often seen about the tonsils and posterior part of the pharynx. In many cases the membrane becomes covered with diphtheritic patches, which can easily be detached, leaving superficial ulcers. Very often inflammation terminates in suppuration and gives rise to pharyngeal abscess.

Symptoms.

*Symptoms.*—The catarrh is generally accompanied by fever. At first the secretion is diminished. The patient complains of a peculiar sensation in the throat or of soreness and pain, accompanied with a sense of heat and dryness. Deglutition is difficult or painful, owing to the dryness and tension of the mucous membrane. In severe cases muscles of the palate are infiltrated with serum, are unable to work, and so food passes into the larynx or into the nose. Sometimes there is frequent inclination to swallow, owing to the uvula touching the tongue. There is hawking cough; even speaking causes pain; the voice is often thick, nasal, and husky, owing to the implication of the larynx, and also because the uvula cannot vibrate, and therefore air cannot be properly passed into the nose; the breathing is free and natural, and there is occasional deafness. All these symptoms become worse at night, and after sleep. Generally catarrhal stomatitis is present with it. The stomach is disordered, and there is coated tongue, bad taste, and foul breath. There is deafness and pain

from extension of catarrh to the Eustachian tube and tympanum. These may be relieved by natural perforation of the drum, and by letting out pus. Generally, in these cases, recovery takes place in a few days.

*Treatment.*—Subduing inflammation by vascular sedatives, and afterwards poultices to the throat are recommended; sucking of ice and external application of cold are also beneficial.

*Treatment.*

### CHRONIC PHARYNGEAL CATARRH.

Chronic pharyngeal catarrh.

Is often the result of repeated attacks of acute inflammation, or may be due to all those circumstances which render the blood poor, as chronic derangements of the stomach and bowels, chronic alcoholism, excess in smoking and drinking, the excessive use of the voice known as the clergyman's sore throat, or a relaxed uvula.

*Post-mortem appearances.*—The mucous membrane of the throat is traversed by varicose veins, is dark coloured, very much swelled, and often œdematous. It is also dry and glistening, or covered with a cloudy secretion. On the soft palate and uvula, the swelled glands have a rough, granular appearance, or may present numerous enlarged vesicles, which on bursting form superficial erosions or ulcers. Very often cheesy plugs or stony concretions are found close to the orifices of the tonsils, which may extend to the larynx or into the nares. The posterior walls of the pharynx look nodulated. In some cases dry crusts (the dried secretion of the mucous glands) are found.

*Post-mortem appearances.*

*Symptoms.*—Slight pain and difficulty of swallowing are present; the cheesy plugs from the tonsils are often hawked up. In severe forms other symptoms are the same as in the acute variety.

*Symptoms.*

*Treatment.*—The cause must be removed. Smoking and

*Treatment.*



alcohol should be avoided. Locally various astringent gargles, caustic applications, as of sulphate of zinc or of acetate of lead, of nitrate of silver, or alum or tannin may be used, or the throat painted with iodine solution made up of Iodine gr. j, Iodide of potassium gr. ij, Spirit of wine ℥j. Fomentations and poultices externally give considerable relief at first. If œdema is threatening the pharynx should be scarified freely. In chronic cases change of air and tonics often lead to good results.

Croupous  
pharyngitis.

### CROUPOUS PHARYNGITIS.

**Definition.** *Croupous inflammation* is an intensified form of acute catarrhal inflammation. As an independent affection it is rare. In some cases the membranous deposit may only affect the tonsils, the rest of the throat merely suffering from the catarrhal variety.

**Causes.** *Causes.*—It is a most common accompaniment of membranous croup and may be associated with typhus fever or some putrid poison in the blood.

**Morbid appearances.** *Morbid appearances.*—Appears as a white membranous patch on the reddened mucous membrane of the pharynx, and when detached there is no loss of substance underneath the membrane; the membrane appears clean and smooth.

**Symptoms.** *Symptoms.*—Are the same as in acute catarrh. The disease is only discovered on inspection. Is very often overlooked.

**Treatment.** *Treatment.*—Remove the membrane by nitrate of silver.

Diphtheritic  
pharyngitis.

### DIPHTHERITIC PHARYNGITIS.

**Definition.** *Diphtheritic inflammation.*—Is never a primary affection; often the result of scarlatina or diphtheria. In this affection the exudation membrane when detached leaves a scar. (For fuller accounts, see “Diphtheria.”)

## PHLEGMONOUS PHARYNGITIS.

Phlegmonous  
pharyngitis.

Definition.

*Phlegmonous inflammation.*—Is a low form of inflammation, in which there is disturbance of nutrition, attended with infiltration and fibrinous exudation, and proliferation of connective tissue, the inflammation either ending in phlegmonous abscess or pus, or in some cases in diffuse mortification and phagedena.

*Causes.*—The same as of other forms above described. Causes.

*Morbid appearances.*—In the acute variety the tonsils are very much enlarged, their surface nodulated, dark red, and covered with a glutinous kind of exudation, and also with croupous deposits, with traces of ulcers here and there. In chronic cases the tonsils appear large and hard, and granular on their surface, and uneven where depressions are left after suppuration. Morbid appearances.

*Symptoms.*—The patient has a rigor, followed by high fever, full and frequent pulse, and temperature  $104^{\circ}$ . There is great pain, tension, and soreness in the throat, the pain extending towards the ear, and deglutition is also painful. There is increased secretion of saliva, coated tongue, foul breath. The voice is nasal (twang), and tonsils almost touch one another. The Eustachian tube and tympanum are often affected. The symptoms increase for three or four days and then subside before the end of a week. Recovery takes place from eight to fourteen days. The opening of abscesses produces rapid relief. The chronic form is the result of a protracted attack of the acute form, in it the pain is slight, but other symptoms are more developed. Symptoms.

*Treatment.*—Locally, early in the disease, use astringents; later on, cold and give ice to suck. If fluctuation be present use poultices or open abscesses early. In chronic cases cold compress externally, and application of nitrate of silver to the throat are useful. Treatment.

Syphilitic  
pharyngitis.

### SYPHILITIC PHARYNGITIS.

*Syphilitic affection.*—There is sometimes only hyperæmia and characterised by swelling of the throat, at others by the mucous papules, the presence of ulcers over the tonsils and uvula and soft palate. Various nodes, gummy tumours, and ulcers are also found in other parts of the pharynx.

Anatomical  
appearances.

*Anatomical appearances.*—The ulcers occupy the soft palate and tonsils. The condylomata are especially on the uvula, the gummy tumours on all parts of the pharynx.

Symptoms.

*Symptoms* can be possibly known later on and from appearance of ulcers. Mucous papules often develop without pain. Gummy tumours do not cause pain till they have ulcerated.

Diagnosis.

*Diagnosis.*—History is the best guide.

Treatment.

*Treatment.*—Application of calomel for three days will often cure.

### RETROPHARYNGEAL ABSCESS.

Retro-  
pharyngeal  
abscess.

*Retropharyngeal abscess.*—Is a rare affection and children are most liable to it. It is said to have been caused by caries of the bodies of the cervical vertebræ.

Morbid  
appearances.

*Morbid appearances.*—A collection of pus pushes the posterior walls of the pharynx forwards. The abscess may be connected with suppuration of or surrounding the tympanum and Eustachian tube, or is often a sequel or a complication of acute specific fevers. The larynx is compressed, narrowed, or even closed.

Symptoms.

*Symptoms.*—The abscess forms a protrusion at the back of the pharynx, which is sometimes uniform, at others only situated on one side. It appears as a soft yielding swelling, often causing pain, and even impeding respiration. The patient complains of difficulty in swallowing, and the food and drink when taken return by the nose; there is alteration or hoarseness in voice, hawking cough and great dyspnoea. The abscess may often open sponta-

neously, and give rise to foetid discharge from the mouth and in foetid odour of the breath.

*Diagnosis.*—It may be mistaken for membranous croup. In abscess there is dyspnoea, with difficulty of swallowing, and on examination the finger detects swelling at the back of the throat. In croup there is a somewhat similar dyspnoea, but the cough and stridulous breathing are characteristic. Diagnosis.

*Treatment.*—The abscess, when detected, should be opened at once. Treatment.

#### ANGINA LUDOVICI.

*Angina ludovici* is a phlegmonous inflammation on the floor of the mouth, and is seldom a primary affection. It is often epidemic, and may result from periostitis of the lower jaw. Angina ludovici.

*Symptoms.*—The disease begins as a painful swelling near the submaxillary gland, and may be felt both inside the mouth and outside under the jaw. The floor of the mouth is pressed upwards, rendering chewing and speaking very difficult. There is also moderate fever. Very often the swelling presses on the windpipe and leads to suffocation. In mild cases the swelling and hardness gradually subside; but in severe forms the inflammation ends in gangrene and death. Symptoms.

*Treatment.*—If seen early apply leeches followed by poultices, and when the swelling fluctuates open it at once. If suffocation be threatening, recourse must be had to tracheotomy. Other symptoms must be treated accordingly. Treatment.

#### CANCER AND STRICTURE OF THE PHARYNX.

*Cancer* of the pharynx is rare.

Cancer and stricture of the pharynx.

*Stricture* of the pharynx, when it occurs, may be the result of pharyngeal inflammation, or simple spasmodic con-



traction, in which case it is temporary. It may be due to local irritation of caustics or mineral acids, leading to destruction of mucous or submucous tissue. Pressure of morbid growths, as aneurysms or tumours from without, also lead to stricture.

**Symptoms.** Symptoms, diagnosis, and treatment are the same as of stricture of the œsophagus.

**Diphtheria.**

### DIPHTHERIA.

**History and causes.**

The word literally means skin or membrane. The affection is otherwise known as putrid sore-throat or malignant quinsy. It may be defined to be a zymotic disease, which may or may not be attended with croup. The disease occurs sporadically, and may be often imparted by air influence, epidemic or of other sort, which in other persons has produced laryngeal diphtheria, and the converse is also true. It may exist as an endemic croup. It may be infectious, and the infectious element does not require anti-hygienic conditions for development. It is doubtful if such conditions even favour its development. The family constitution favours development and affects its progress. The disease attacks indiscriminately those who had or have not had scarlet fever. Thus, the laryngeal membranous affection may arise in connection with catarrh or with specific disorders recognised as diphtheria. The disease is far more fatal in rural districts than in large towns, where many unhealthy influences abound. The disease is most common in children, and occurs between the ages of three and six years.

**Pathology.**

*Pathology.*—It is a specific blood poison. In this affection the blood is considerably altered in its constituents. The fibrin is notably diminished, and the white corpuscles are increased from 3 to 63 per 100. The red corpuscles are destroyed by the poison, and therefore the *débris* is much increased.

*Post-mortem appearances.*—It is a spreading inflammation of the pharynx. It rapidly spreads to the fauces, œsophagus, and to the respiratory tract. There is at first redness, and more mucus is secreted than natural. It results in the exudation of lymph, which at first forms a thin grey pellicle on the surface; gradually new layers form beneath it, and thus the membrane becomes thickened. Under microscope the false membrane appears to consist of elements of corpuscular exudation cells, of epithelial molecules, of pus corpuscles and blood corpuscles, of fatty granules and interlacing fibrillæ, and fibres as are often seen in buffy coat. Enlarged lymphatics at the angle of the jaw and down the neck can be felt. Under alcohol, with nitrate of silver, or with salts of iron the membrane shrivels. With pepsine, with alkaline salts, and with lactic acid it quickly softens. Hence these may be said to be appropriate local applications in such cases.

Post-mortem  
appearances.

*Varieties.*—1. *Mild form.*—In this disease there is little exudation; slight fever; the glands at the angle of the jaw enlarged; no albumen in urine; no subsequent affection.

Varieties.  
Mild.

2. *Inflammatory form.*—Symptoms are of severe cynanche pharyngea, and precede the exudation. Redness and swelling of the uvula is often great; the exudation has often a jelly-like transparency. Pain in swallowing is great. Febrile disturbance is severe. Pulse is frequent at first, but soon becomes weak. In twelve or forty-eight hours from the first throat symptoms, tough lymph appears. Death may be due to extension of inflammatory exudation to the larynx or to the trachea.

Inflam-  
matory.

3. *Insidious form.*—No severity in general symptoms, no marked soreness of throat, no great swelling of lymphatics, suddenly laryngeal symptoms supervene, and death rapidly follows from suffocation. If the pharynx be not examined the disease is confounded with primary croup.

Insidious.

Nasal.

4. *Nasal form*.—There is low febrile disturbance. The sanious discharge from the nose first attracts attention, the glands at the angles of the jaws swell, the arches of the palate and tonsils are red and swollen, muco-purulent fluid bubbles from the narrow isthmus of the fauces, the disease subsides or spreads to the larynx, and death or infection reveals what its character has been.

Laryngeal.

5. *Primary laryngeal form*.—In this variety there is exudation at first on the larynx. This seems to differ from croup in age only. In one case the patient was aged forty-five years.

Asthenic.

6. *Asthenic form*.—General and local symptoms at first are moderate. The pulse becomes soon rapid and feeble; the sense of illness is extreme; the lymphatics are always of softer form; the patient may swallow well or have pain on swallowing. Death takes place from eight to ten days from failure of heart's action.

There is no sharp line between these varieties. *Duration* is generally from forty-eight hours to fourteen days. When fatal within a week death is always preceded by exudative inflammation of the larynx. The laryngeal symptoms never begin after the first week, they may be present from the onset. Death may be due to asthenia or to laryngeal affection. After the termination the symptoms are due to deranged innervation.

Terminations.

*Terminations*.—The commonest form is impaired voice and power of deglutition. The loss of nervous power may be general. Patients may die in such cases, but from the cases recorded death does not seem to have been distinctly due to any paralysis, though there may be signs of paralysis, as snuffing voice or return of fluid through the nose. There is a case of a student who had loss of vision of the right eye, and as sight returned tingling and want of power in the feet came on, the right foot became first affected, then the upper extremities below the elbows

with tingling in the hands, as if something was placed between the fingers which they touched. There was no albumen in the urine, and he recovered after some months.

*Diagnosis.*—Diphtheria and croup are not the same disease. There is no evidence to show that croup is more than local, that croup is contagious, that croup occurs as an extended epidemic, that croup affects many adults, that in croup there is albumen in the urine, and that in croup symptoms of disordered innervation follow. Diagnosis.

*Prognosis.*—No case is unattended with danger. During the first week there is danger of larynx being implicated. Therefore a laryngeal quality in respiration is a grave sign. After the first week, even where the symptoms may be slight, a very rapid and feeble pulse or an intermittent pulse, vomiting, bleeding from the nose, abundant albumen in the urine, and delirium, all give rise to apprehension, and the younger the patient the worse is the prognosis. Prognosis.

*Treatment.*—Any direct local application to the throat is most injurious; leeches and blisters do harm; even poultices and fomentations give no relief. Nature tends to heal by suppuration, and thus false membrane is thrown off. Therefore allow from the very beginning repeated inhalations of acid vapours (vinegar 2 ozs. to 20 ozs. boiling water), and when the pellicle begins to form, at once paint the fauces with glycerine and tincture of iron, or glycerine with turpentine, or glycerine and carbolic acid, all in equal proportions. Use also gargles of tincture of iron 1 dr. to 7 drs. of water. Many use solution of 100 grs. carbolic acid, 50 grs. iodine, 1 oz. spirit, and 7 ozs. water, or diluted solution of soda; of late, the spray of sulphurous acid in these cases has been tried. Local application of pepsine, or of lactic acid, with glycerine deserves attention. Support the system. Give freely emetics of Ipecacuanha with ammonia, and also alkaline drinks. Avoid complications. If there be much prostra- Treatment.



tion, the urine albuminous, or a tendency to hæmorrhages, iron in large doses will do good. For thrombosis use ammonia, bark, &c.; some use iodide of potassium and chlorate of potash in such cases. Use milk, beef tea, wine, champagne, &c. The patient should be kept in bed and clothed in flannel; the air of the room should always be kept warm. If the exudation be such as to obstruct the larynx an emetic may be tried, but should it fail, perform tracheotomy to prevent suffocation and to save life. When the attacks of dyspnœa are only paroxysmal and with long intervals between them the inhalation of chloroform often proves serviceable. During convalescence give vegetable tonics, quinine, strychnia, bark, cod-liver oil, &c. Good diet and change of air to the sea-side may be recommended. Constant electric current is also useful as a cure for the paralysis.

Diseases of  
the  
œsophagus.

Anatomical  
relations.

### DISEASES OF THE ŒSOPHAGUS.

*Anatomical relations.*—The mouth, tongue, fauces, and tonsils need no anatomical description, as these organs are quite open to view and can easily be discerned. The œsophagus commences in the cricoid cartilage, extends downwards and to the left from the lower border of fifth cervical vertebra, it then passes through the diaphragm and opens into the stomach. In the neck the recurrent laryngeal nerve and before it the trachea lie in front, and the common carotid artery lies on its either side. In the chest the trachea lies in front of it for some portion, the left bronchus also lies in front of it, and in this part the œsophagus is covered by the pericardium. The pleuræ lie on either side of it in the chest. It is worth remembering that the transverse portion of the arch of the aorta lies in front of the œsophagus, on a level with the second and third dorsal vertebræ, that the descending

portion partly occupies, with the transverse portion, the front of the œsophagus, a major portion of it lies to the left of the œsophagus, and also somewhat in front of it, and again just at the opening of the œsophagus into the diaphragm it also goes quite in front of it.

The affections of the œsophagus are treated in the following order:—1. Acute affection; 2. Chronic affections which include ulcers, stricture, dilatation and spasm; 3. Morbid growths; 4. Perforation and rupture; and 5. Neurosis. Classification.

These affections have clinical phenomena in common. The *Subjective* refer to—1. Pain in front or behind the chest, between the shoulders, as of obstruction by a foreign body in the throat; 2. Pain or obstruction during swallowing; rejection of food and drink, either by the mouth, œsophagus, or the stomach. *Objective*.—These are revealed by—1. Inspection—If any obstruction be present and its seat. 2. Palpation—It is done by passing a bougie down the throat, and on removing it we determine from the kind of material it brings up with it, the nature of the affection. 3. Auscultation—The application of the stethoscope to the œsophageal region gives, if any narrowing be present, a sound as of something passing from a narrowed portion into a wider space.

### INFLAMMATION OF THE ŒSOPHAGUS.

Inflam-  
mation.

Catarrhal inflammation of the œsophagus is generally acute. Catarrh.

*Causes*.—It may be a simple cold extended to the tube, or may be associated with catarrh of the stomach, or may be part of venous congestion of the whole alimentary canal; or may be due to direct injury or to irritation by foreign bodies. Causes.

The *croupous* variety is rare. It occurs in typhus. The *pustular* inflammation is found in burns by acids and cor- Croupous.

rosives, or from extension of pustules of eruptive fevers as in variola. The *ulcerative* inflammation occurs after the use of tartar emetic. They are generally caused by foreign bodies, and may be a complication of specific fevers.

Post-mortem  
appearances.

*Post-mortem appearances.*—The mucous membrane is red and swollen; there are various deposits on its surface, occasionally abrasions and ulcers. When due to corrosive substances the mucous membrane is black and brown. The chronic catarrh generally causes dilatation and stricture.

Symptoms.

*Symptoms.*—There is very little sensibility of the œsophagus in the normal state, there is therefore only pain in very severe cases of inflammation in the course of the œsophagus, or the pain and heat is felt deep in the chest, or between the shoulder blades. Deglutition is painful and difficult; the food is rejected with mucus, or with blood, or membranous shreds, and pus. There may be great thirst and slight fever. Very often bloody mucous expectoration may be brought up. May end well or death takes place from stricture of the œsophagus.

Treatment.

*Treatment.*—Allow sucking of ice; give as much liquid nourishing diet as can be taken. Opium may be given to produce rest, and to subdue pain.

Chronic.

### CHRONIC AFFECTIONS OF THE ŒSOPHAGUS.

These are divided into—1. Ulcerative inflammation. 2. Stricture or obstruction, or its opposite, dilatation of the œsophagus; and, 3. Spasmodic or paralytic affections.

Ulcerative in-  
flammation.

### ULCERATIVE INFLAMMATION.

Causes.

*Causes.*—It may be the result of acute inflammation, or occurs in weak and debilitated persons, or may result from smallpox pustules, or be due to syphilitic or scorbutic diathesis, or to local irritation of destructive agents, or to perforation from without.

*Symptoms.*—The patient complains of a localised pain of Symptoms.  
a burning character. The deglutition is painful, and even impossible, owing to the local irritation and to spasm; the bougie brings up mucus and blood with it.

*Terminations.*—Small ulcers get well without leaving Terminations.  
any trace behind. The extensive and deep ones, if they heal, give rise to cicatrices and consequent contraction of the tube, and to stricture of the Œsophagus. Very often they perforate through the trachea and lead to a fistula, or may open into an artery and cause hæmorrhage.

### STRICTURE OR OBSTRUCTION.

*Stricture or obstruction* is a permanent narrowing or Stricture.  
complete closure of the gullet. The stricture may be organic or functional.

*Causes.*—1. Functional may be due to compression or Causes.  
external pressure. 2. Organic may depend on protrusion of growths within the tubes, either separate or from within the walls of the Œsophagus, as fungous growths; or malignant tumours, as epithelioma or colloid cancer. 3. Structural changes in its walls, as cancerous infiltrations, thickenings and cicatricial contractions from extensive ulcers, or wounds and corrosions. It may be the result of chronic inflammation leading to hypertrophy of muscular and intermuscular contractile tissues. The stricture from compression may occur in various ways. There may be enlargement of the thyroid and lymphatic glands, dislocation of hyoid bone, exostosis of vertebræ, abscess or tumours between the trachea and the Œsophagus, carcinoma of the lungs or pleura, aneurysm, diverticulæ of the Œsophagus itself, and abnormal distribution of the right subclavian. Above the stricture the walls are generally hypertrophied, and below, they are thinned.



## Symptoms.

*Symptoms.* — Stricture develops very slowly. The patient finds difficulty in swallowing food, and especially solid food, owing to the narrowing of the tube and to subsequent spasm from the presence of food. The patient refers the hitch to a particular part, and there is also pain and soreness in that spot. The food thus accumulates above the seat of obstruction, and is regurgitated with a gulp. The patient soon emaciates and becomes weak, while his abdomen is greatly retracted, and there are all the signs of starvation. A bougie gives an accurate information about the nature of the obstruction and its seat, and about the cause of stricture by the substances it brings up. The food is almost always alkaline, and generally decomposed. The pain is only present if the stricture be due to cancer or an ulcer.

## Terminations.

*Terminations.*—The patient dies from starvation. The mind remains clear to the last. If the stricture be due to the presence of organic disease it can be determined by the following points of inquiry. It is important to determine the seat of stricture. The sensations of the patient are the best guide. If the obstruction be at the upper part regurgitation immediately follows deglutition, and some portion may escape into the larynx. If lower down the food comes up after some minutes. On making the patient swallow a liquid, and while doing so on auscultating the œsophagus, a prolonged gurgling will be heard at the seat of obstruction.

## Treatment.

*Treatment.*—Patient and persistent dilatation do much good.

## Dilatation.

## DILATATION OF THE ŒSOPHAGUS.

It may be of the whole tube, or may be partial and confined to a part. In the partial form the wall of the tube is inverted, forming a sort of hernia or sacculation on one

side. Dilatation is commonly found above the seat of constriction.

*Causes.*—It may be due to lodgment of a foreign body, in which case the tube is dilated, the portion below being narrowed. Dilatation may arise from stricture. If general it may be due to muscular paralysis, to chronic catarrhal inflammation, or to shrinking of the bronchial glands. Diverticulæ may be due to foreign bodies, or to shrinking of the bronchial glands. Causes.

*Morbid appearances.*—The tube is often dilated to the size of an arm. The walls generally are hypertrophied. Diverticulæ generally form near the bifurcation of the trachea. Morbid appearances.

*Symptoms.*—When general there are no symptoms present. In dilatation partial regurgitation of food with mucus takes place, and the food is alkaline. Symptoms.

*Treatment.*—Exploration with the bougie is the only remedy. Treatment.

### SPASM.

*Spasm.*—Spasmodic stricture of the œsophagus often leads to symptoms of organic stricture, and in many cases, if long continued, to death by starvation. Spasm.

*Causes.*—Diseases of the brain, organic or functional; intemperance in drink; pressure on the œsophageal nerves either by morbid growths or superficial ulcers. Causes.

*Symptoms.*—There is dysphagia, but no pain in any part of the œsophagus. Sudden stoppage takes place now and then while taking food. The spasm often yields after several attempts at swallowing food, and the deglutition is then comfortable. The history and general health of the patient, and the free passage of the bougie help a correct diagnosis. Symptoms.

*Treatment.*—The injection of food by other channels in cases of organic stricture is the only means of prolonging life. Treatment.

## PARALYSIS.

- Paralysis.** *Paralysis.*—This affection is extremely rare; may be due to diphtheria; and may follow hysteria or brain affections.
- Symptoms.** *Symptoms.*—The patient can easily swallow solid food, but liquids are rejected. The bougie passes without difficulty.
- Treatment.** *Treatment.*—In such functional cases attention to the nervous conditions cures the obstruction.

Morbid  
growths.

## MORBID GROWTHS.

*Carcinoma* chiefly affects the upper or lower third of the œsophagus, and is somewhat rare; it is rapid in its progress, and the cervical glands are affected.

Fibroid tumours are rare.

- Post-mortem appearances.** *Post-mortem appearances.*—Where the stricture continues for some time the gullet becomes hypertrophied and dilated above the seat of cancer. In the distended portion food accumulates, and causes irritation and ulceration, and even perforation, or the cancer breaking up may cause perforation of the trachea, bronchus, or aorta.

- Symptoms.** *Symptoms.*—Small fibroid tumours cause no symptoms; larger ones may cause symptoms of stricture and hæmorrhages. *Carcinoma* is not easily mistaken; cachexia, difficulty of swallowing gradually occurs, lancinating pains shooting backwards and into the scapula, great dyspnoea, dysphagia and dyspepsia, and fragments of cancer coughed up make the diagnosis certain.

- Duration.** *Duration.*—Cancer of the œsophagus has been known to terminate in death in six weeks, and its duration is always short.

- Treatment.** *Treatment* of the symptoms.—Opium is beneficial.

Bougies are to be used with caution; they may lead to sudden discharge of blood in large quantities.

*Perforation and rupture.*—May be from within outwards or from without inwards. Rupture is rare. Adhesions generally occur. Perforation and rupture.

*Neurosis.*—Occurs in hysteria. There is globus hystericus. Hyperæsthesia of the œsophageal sensory nerves, with increased excitability of motor nerves. The spasm of the œsophagus which is generally reflex, and occurs in paroxysms with free intervals. It may cause vomiting and there is a spurious stricture, which a bougie will make obvious. Neurosis.

*Treatment.*—Narcotics, especially belladonna, and antispasmodics, as valerian, musk, and assafoetida are useful. The excitability of motor nerves prevents swallowing. Put the patient upright and give strychnia, or try electricity, and neurosis will be cured. Treatment.

## DISEASES OF THE STOMACH.

Diseases of  
the stomach.

The stomach is the central organ of the process of digestion. It is situated in the upper part of the abdominal cavity, and extends across from the left side, at which the œsophagus enters, to the right, where it terminates in the small intestine by a constricted opening called the pylorus. This valvular opening only allows digested matter to pass onwards; there are also similar but weaker sphincter fibres around the cardiac end, which prevent reflux of food into the gullet.

*Anatomy.*—The stomach consists of a layer of simple or unstriped muscular fibres and circular fibres, of the innermost or mucous coat, on which is situated the glandular apparatus. When the stomach is empty this mucous coat, which is loose, is thrown into a number of rugous folds, which become entirely obliterated when the organ is fully Anatomy



distended. The mucous coat is of a pale pink colour when in a quiescent state, but deepens into a bright red hue when active. The mucous membrane consists of a superficial epithelial layer and columnar-shaped cells and a deep layer, which is made up of basement membrane, and fibro-vascular tissue. The stomach is highly vascular; is supplied by one of the three divisions of the cœliac axis. The blood returning from the stomach forms a part of the portal system, and passes through the liver before it reaches the systemic veins. The nervous supply is received from the cerebro-spinal and sympathetics.

Physiology.

*Physiology.*—The secretions of the stomach are gastric juice and pepsine. The *gastric juice*, a limpid, transparent colourless liquid, strongly acid, of a saline taste, and a faint, peculiar odour, is a powerful agent in resisting putrefaction or decomposition, and is useful for dissolving nitrogenized principles of our food. The solvent effect is due to its containing an acid and also an organic principle called pepsine. Neither of these agents act when alone. *Pepsine* by itself possesses the power of curdling milk. It is always present in the mucous membrane of the stomach during digestion or during fasting, or even under the severest forms of disease. The gastric juice generally flows from the follicular glands for the ingesta to be digested, but when the stomach is empty they also pour into the stomach as a little transparent mucus. When food or anything enters the stomach the mucous membrane becomes turgid and reddened, is increased in vascularity, and the stimulus of food causes exudation of gastric juice. The quantity of juice secreted varies with the stimulating character and digestibility of food ingested. If the food be difficult of digestion a larger quantity of juice is poured out; it is an ascertained fact that the secretion of juice is increased by alkaline food and diminished by food containing acids, that ice, cold drinks, strong spirits, tea

or coffee, and various aromatics, also increase the secretion. During fever secretion of the gastric juice becomes greatly diminished or even entirely suppressed. Liquid food and drinks are absorbed in ten minutes after being swallowed; solid food remains undissolved for twenty-four or forty-eight hours or more. Thus, during dyspepsia the solid and undigested food aggravates the other dyspeptic symptoms, and in many cases vomiting is induced as a consequence. The temperature also influences greatly the rate of digestion.

### FOOD OR DIET.

Food.

Diet is all essential in maintaining a healthy condition of the stomach. The stomach is an organ which is more accessible than any other to its direct influence. Our general health, comfort, and aptitude for the daily concerns of life depend upon healthy digestion. Cooking and fermentation are means by which man assists the natural processes of digestion. Diet consists of *albuminous* aliments, both vegetable and animal, *saccharine* and amylaceous food, of *liquids* and *condiments*. Albuminous food is found in the blood of animals, which also contains a white fibrinous substance, which goes to nourish muscles; hence it is the most nourishing and digestible food. White of egg is another, and cheese is a third. Vegetable diet as wheat also contains fibrin, albumen, and casein. Gluten is the vegetable fibrin, and very nutritious, as in the form of vermicelli, maccaroni (Sev, Guoonududh *Guzerati*). When turnips or cauliflower are boiled a coagulum separates which resembles the albumen of eggs. Peas and beans when boiled in water form a curd as of milk on their surface; this is vegetable casein. For perfect digestion several of these aliments should be combined.

Fermentation.

*Fermentation.*—There is no kind of food capable of digestion which does not contain some of the substances

which act as *ferments*. The stomach has also its mucous secretion, which has the same property. Albuminous or azotised food only acts as a ferment when decomposed, and in them decomposition is therefore arrested by boiling and by the action of gastric juice. When decomposition is fairly established it often causes indigestion and diarrhœa, and even death from poisoning.

Wheat is the only kind of grain which is adapted for fermented bread. The fermentation is vinous, but when badly managed, especially when the dough is long kept, the vinous runs into the acetous fermentation. When fermented bread is taken by dyspeptics it is apt to pass again into further fermentation and produce acids in the stomach. In them biscuits are therefore preferable. Potatoes and cereal grains are compound aliments, and contain albuminous, saccharine, and amylaceous principles, or substances capable of undergoing ferment.

Gastric  
digestion.

*Gastric digestion.*—The *time* required for food to be properly digested in the stomach varies with the nature and quantity of food, and the condition of the stomach. A moderate meal of meat would require three to three and a half hours. Food in a state of minute subdivision contributes greatly to expedite digestion; gentle exercise, by increasing the circulation and temperature of the stomach, hastens it. Fatiguing exercise on account of the exhaustion following it and the depressed state of the system consequent upon perspiration and evaporation from the surface retards digestion. Digestion is the preparation of food for absorption. This is done by reducing it into a liquid form; this is effected in the stomach and intestines immediately antecedent to absorption.

In the stomach the food undergoes *chymification* or gastric digestion; in this organ it mixes with a solvent fluid and forms chyme. The chyme then passes into the small intestines, where it is further incorporated with other secretions, and thus the watery-looking chyme is converted

into rich cream-like *chyle*, which is fit for intestinal digestion. In the small intestine its villi pick out from chyle its nutritive elements and discharge them into the lacteals, which conduct them into the circulatory system to replenish its contents. Those portions which escape digestion are urged onwards and expelled by defecation.

A perfect diet ought to contain definite proportions of the four chief kinds of food. The diet sheet of St. Bartholomew's Hospital gives four well-arranged varieties. As it is nearly as important to write down diets for patients as prescriptions, this diet table is given in full at the end of Diseases of the Stomach. The amount of water-free food required by a healthy man is estimated thus:— Assuming water-free food to be about 20 ounces (refer to p. 6) and an average weight to be 140 pounds, each pound weight of the body receives in twenty-four hours  $\frac{1}{70}$ th part of its own weight of water-free food. This is the dry food, but about 60 per cent. of water is usually contained in it. In addition with this quantity about 60 ounces of water are also taken daily, in some liquid form, making a total supply of water of 70 or 75 ounces, or an average  $\cdot 8$  ounces to each pound weight of body.

Water-free food consists of—

	lbs.	oz.		In laborious work.		In quietude.
Albuminous substances	. 4	2	...	6	...	2.5
Fatty substances	. 2	9.9	...	3.5	...	1
Carbo-hydrates	. 12	15	...	16	...	12
Salts	. 0	14.9	...	1.2	...	.5
	<hr/> 20			<hr/> 26.7		<hr/> 16

So long as a healthy digestion exists, the ingestion of a meal gives rise to no other sensation than that of comfort and satisfaction. If a state of uneasiness follows after food it may be inferred either that the food taken is beyond the natural limits or that the stomach and intestines are not



performing their work in a natural way. This deviation is known as dyspepsia or indigestion. It may be slight sense of oppression, weight, distension, or severe pain and tenderness.

### DYSPEPSIA.

Dyspepsia.

*Dyspepsia* is a disturbance of digestion without any change of structure in the stomach or intestines. The symptoms observed are diverse and numerous. They refer to derangements of the stomach, either to perverted sensibility, to perverted muscular action, or to perverted secretions. They are not limited to deranged digestion, but through reflex influence also affect other parts, and so lead to the occurrence of deranged actions elsewhere. Thus the concomitants of dyspepsia are as multifarious as those belonging to hysteria.

As deranged digestion gives rise to various functional disturbances in other parts, so dyspepsia may likewise be produced by derangements existing elsewhere. Healthy digestion depends upon the action of certain secretions, which are subject to general state of health and vigour. Under any deranged state of the system the secretion of the stomach, and especially the gastric juice, becomes impaired, and dyspepsia follows as a consequence.

Causes.

*Causes.*—*External* are: Errors in diet. Too large a quantity, or improper quality or badly cooked food, or food taken at irregular times, not allowing sufficient interval between the meals; or food imperfectly masticated. Drinking too large a quantity of liquid along with the food. Ice and iced drinks at dinner and at dessert, by lowering the temperature of the stomach. Abuse of strong alcohol; condiments which render pepsine insoluble; want of bodily exercise; eating while in a state of exhaustion or fatigue. Dyspepsia may be secondary to morbid conditions of blood, or morbid state of the brain, to diseases

of lung, liver, or uterus; or to reflex actions. Hereditary weakness of the stomach and intestines; undue or over-work of digestive organs, just as over-mental work causes derangement of the brain, also leads to dyspepsia. *Internal*: alterations in the healthy characters of the gastric juice. Changes affecting the action of the stomach, as want of muscular or nervous tone of the stomach; dilatation of the stomach; and pyloric obstruction.

*Symptoms*.—There may be slight sense of uneasiness or morbid sensations known as spasm or cramps, and other uncomfortable sensations. The patient complains of uncomfortable sensation over the epigastrium immediately after food, but there is no tenderness. There is anorexia. The sight of food or the thought of eating produces a feeling of discomfort. There is no thirst. The food ferments and decomposes, and thus produces flatulent distension, fullness and weight in the stomach, heartburn, sense of heat at the pit of the stomach, acidity, eructations of gas resembling rotten eggs, and liquid eructations or pyrosis. Acid eructation from excess of gastric juice, bitter eructations from bile, &c., also occur. Nausea alone is felt in many cases, it may exist with vomiting. The bowels are constipated, or in some cases diarrhoea, with colicky pain, and passage of foetid gas follows. The breath is offensive. There is distension in the left hypochondrium after food, the tongue is coated; there is palpitation, headache, and depression of spirits. Stomach becomes distended, oppression of breathing is produced, and the patient is irritable. Symptoms.

*Morbid sensations* experienced by the patient are known as pain, spasm, or cramps of the stomach.

*Spasm* is a pain produced by flatus, free use of ice, indigestible food, or drink, or as an accompaniment of lead colic. The pain may often arise from morbid condition of the nerves of the organ, and is then called gastrodynia. Spasm.

The pain which occurs towards the conclusion of digestion, or when the stomach is empty is due to defective digestion and generation of acids. Such pains are therefore relieved by alkalies and bitter infusions, by carminatives and opium. Spasm may be due to results from organic morbid change in the stomach, as of ulcers. It may be often reflex, and is then usually due to anæmia or to uterine disease.

*Symptoms.*—Severe paroxysmal, griping, or twisting pain, coming on suddenly, and most marked at the pylorus, and relieved by pressure and by vomiting, is the characteristic symptom. It may even cause prostration and collapse.

*Treatment.*—Emetics and carminatives. Dry heat to the stomach, or powdered snuff with castor oil locally applied to the umbilicus relieves pain in a short time.

Pyrosis.

### PYROSIS.

When the mucous membrane of the stomach is exposed to cold a sort of catarrhal affection takes place. This occurs generally after a long-continued congestion or inflammation. In the affection there is a secretion of watery mucus, and the condition is known as pyrosis or water-brash. The secretion is alkaline at first, but by mixing with fermented food it becomes acid.

*Causes.*—It can be produced by indigestible food, and is due to the diminution of gastric secretion and increase of unhealthy mucus, which acts as a ferment. Excessive study or mental anxiety has a similar effect by diverting the blood from the brain to the stomach. Excessive fatigue has the same effect.

*Symptoms.*—In anæmic persons who have lost large quantities of blood from any cause, and in whom digestive

activity has been much lowered and they could only digest the lightest kind of food ; any less digestible diet produces spasm, pyrosis, sickness, and vomiting. In anæmia the stomach is weak, so that digestion becomes laborious and is performed slowly and imperfectly. Thus there is a feeling of uneasiness after meals and flatulent distension until the digestion is finished. If the stomach be very sensitive there is eructation of half-digested food into the mouth but without sickness. The uneasiness often tends to assist eructation by a partial voluntary effort. There is also heartburn and pyrosis. Other organs are deranged, both directly from anæmia and secondarily from disordered stomach. Thus we have diarrhœa, leucorrhœa, and catarrh of the bronchi. In such cases the undigested food being arrested at the pylorus, pains are experienced. The natural secretion of gastric juice becoming defective, the digestion becomes slow and difficult ; the food is therefore long retained in the stomach, and acting as an irritant, causes unnatural mucous secretion and produces fermentations. The fermentations leading to heartburn, acidity, eructations, and sickness.

*Treatment* consists in giving tone to the system by those remedies which increase the red corpuscles of the blood. A rigid system of diet must be adhered to, and the bowels kept in regular order. Treatment.

### VOMITING AND RETCHING.

*Vomiting* is a morbid action, and consists in the rejection of the contents of the stomach by means of violent and usually involuntary efforts. *Retching* is an effort without any ejection. *Causes.*—Irritating or noxious food ; organic disease of any portion of the alimentary canal ; mechanical obstruction in any part of the intestinal tract ; reflex irritation of the throat ; organic disease of the brain and its Vomiting.



membranes ; irritation of the genital organs ; tubercular peritonitis ; passage of a calculus ; and morbid states of blood. *Symptoms*.—Vomiting is ushered in by a sense of uneasiness and a feeling of nausea. It is accompanied by faintness or giddiness, coldness of surface, pallor of the face, dejected countenance, small, feeble, and irregular pulse.

Diagnosis.

*Diagnosis*.—It may simulate vomiting due to cerebral disorder.

TABLE showing distinctive features between Gastric and Cerebral Vomiting.

<i>Gastric.</i>	<i>Cerebral.</i>
Nausea precedes or attends.	Nausea absent.
Headache precedes ; relieved after vomiting.	Headache may precede or accompany, and continues after vomiting.
Pain in the epigastrium, with tenderness.	Pain in the head.
Derangement of alimentary canal: as furred tongue, offensive breath, conjunctivæ yellowish, gripes in abdomen, diarrhœa, clay-coloured stools ; and increased salivation.	Headache increased on movement of the head, conjunctivæ injected or colorless, bowels constipated, no salivation.
Relieved by counter-irritation to the epigastrium.	Relieved by counter-irritation to the neck.
Increased by pressure on epigastrium.	Increased by movement of head.
Disgust for food even after vomiting.	Asks for food after vomiting.
Ceases after the stomach is empty.	Continues even after the stomach is empty.

Treatment.

*Treatment*.—1. The cause must be sought out and removed if possible ; emetics may be given, and stomach cleared out of irritant matters. Patient should be warned against bringing it on by coughing, or by any voluntary effort. 2. Diet should be given in small quantities in liquid form, and iced. 3. Absolute rest, fresh air, and horizontal position afford relief. 4. Small and repeated

doses of ipecacuanha may be given every hour. Various applications to the stomach, as iodine paint, flying blisters, issues, chloroform liniments, and mustard plasters. Spirit of *nucis juglandis* (walnut) may be tried internally.

## ACIDITY AND HEARTBURN.

Acidity.

Another important symptom of the disorder of the stomach is acidity and heartburn. Acidity may arise from acid food, by generation of various acids in the stomach, by fermentive action and from excessive secretion of gastric juice. These acids are lactic acids, and acetic acids, they are a common cause of pain, heat, and sinking sensation at the pit of the stomach. Another acid called butyric acid is produced by fermentation of sugar and starchy food, and is the chief cause of heartburn.

Heartburn, as a result of excessive gastric secretion is common in the aged and gouty, in those who live freely, and in whom assimilation is defective. In them uric acid is retained in the blood instead of being consumed by more perfect oxygenation or excreted by the kidneys.

Heartburn.

*Treatment.*—When the heartburn arises from fermentive action, neutralize acid matters which irritate the stomach, stop further fermentation by giving antiferments, and remove those conditions of the mucous membrane of the stomach which by producing increased secretion of mucus facilitate fermentation. Alkalies give quickest relief; bitters, with some mineral acids correct the tone of the mucous membrane. As congestion of the liver by producing a similar congestion of the stomach leads to heartburn and other stomach disorders, this can be cured by increasing the excitability of the liver functions, hence, blue-pill with aperients are useful. In cases of gouty dyspepsia alkalies are the best remedies, they neutralize the acids and also act as an eliminant by the liver and

Treatment.

kidneys. In these cases fermented liquors should be altogether avoided. A cheerful mind, healthy exercise and light diet will do good. In no condition of body are the lines of the scholar Salernitana more applicable—

“ Si tibi deficient medici, medici tibi fiant  
Hæc tria : mens hilaris, requies, moderata dieta.

Fermentative  
disorders.

### FERMENTIVE DISORDERS.

Besides what has been already said about the disorders of the stomach there are others attended with fermentation, and generation in the stomach of a peculiar fungus called *sarcina ventriculi*. We know that fermentations generally are chemical processes, which produce changes in the stomach, and consist of organic matters of animal and vegetable origin. The food undergoes the first process of fermentation, and that the bread we eat is produced by fermentation of flour, and the wine we drink is a fermented liquor from the juice of the grape.

Varieties of  
ferments.

*Varieties of ferments*—*Saliva*, by a kind of fermentive action, causes the conversion of starch into sugar. This is known as saccharine fermentation. *Saliva* is a secretion from the salivary glands and from the mucous glands of the mouth.

Gastric.

The *gastric juice*, as a ferment, dissolves albuminous kinds of food. It contains two acids, hydrochloric and lactic acids, and a resin called *pepsine*. It has no influence on starch, gum, or fat.

Pancreatic.

*Pancreatic juice*, by a fermentive action, converts starch into sugar, and also promotes absorption of fat by emulsifying it.

Hepatic.

*Hepatic juice or bile*, as a ferment, serves to neutralise the acidity of food, and also promotes the absorption of fat. It has also the power of checking further fermentation of food after it has once passed the duodenum and intestines. This is manifested by the circumstance that when the

secretion of bile is arrested, the intestinal contents undergo putrefactive decomposition, and flatulence and diarrhoea result.

*Intestinal juice* also acts as a ferment, and is a secretion from intestinal mucous membrane and gland follicles. Is a universal solvent of intestinal contents. Intestinal juice.

The *oxygen* of the atmospheric air is a moving power to excite first changes in the fermentation. Oxidised substances, as albumen of eggs, or gluten of wheat, if exposed to the action of the atmosphere readily undergo fermentation; but when mixed with a ferment, and if oxygen be excluded, fermentation does not occur.

The *effects* of fermentation is to reduce complex organic substances into a simpler compound. Ferments are all of an albuminous nature. Thus, the secretions of the stomach, and also of the mucous membrane, which act as ferments, consist of gelatinous and albuminous matter. Effects of fermentation.

*Varieties of fermentation.*—*Saccharine.*—Occurs in disordered digestion, and is the chief cause of diabetes. Varieties of fermentation.

*Vinous.*—Is that by which sugar is converted into alcohol and carbonic acid.

*Mucous or viscous.*—Is a variety of sugar fermentation, and occurs when there is deficiency of yeast.

*Lactic* fermentation is known by coagulation of milk, which when fresh is alkaline and so kept in solution by alkaline phosphates. Its sugar undergoes lactic fermentation.

*Butyric.*—That at a temperature of  $78^{\circ}$  to  $90^{\circ}$  milk becomes sour from lactic fermentation, but at a higher temperature of  $90^{\circ}$  to  $100^{\circ}$  it undergoes further changes by forming an oily acid, which is known as butyric fermentation. During digestion of milk this and lactic acid fermentation are the chief sources of acidity and heart-burn.

*Checks on fermentation.*—*Boiling temperature* puts a Checks on fermentation.



stop to fermentive action. Thus, meat is preserved for years by being sealed up at a boiling temperature, so as to exclude the air perfectly.

*Freezing cold* and many chemical substances also completely arrest fermentive actions. These are *sulphurous acid* and its salts, the vapour of burning sulphur, the bisulphite of lime, sulphuric and other mineral acids. Many metallic salts by coagulating albumen also check fermentation. These are *salts of mercury and copper*. *Tannin and alum* have the power of coagulating mucus, and thus check mucus fermentation. *Corrosive sublimate* and *arsenic* act as ante-ferments by killing fungi and protozoa and *nux vomica* by destroying protozoa only. Creasote acts by coagulating albumen. *Nitrate of silver* arrests fermentation in a decided manner.

Acute gastric  
catarrh.

### ACUTE GASTRIC CATARRH

Is a common disease. During normal digestion changes take place in the mucous membrane, which in any other mucous membrane would be called catarrh; but in catarrh of the stomach there is extension of the digestive processes beyond normal limits. There is hyperæmia followed by a flow of mucus and detachment of the epithelium, and the process is accompanied by slight general disturbance, known as the digestive fever.

Causes.

*Causes.*—Predisposition varies with the individual. In some cases the increase of predisposition depends on a diminution of the gastric juice. In all fever cases the increased loss of water by the skin and lungs leads to this disorder; and hence diet must be adapted according to the diminished secretion. 2. In all ill-nourished persons, the diminution of the gastric juice favours the decomposition of the ingesta. 3. In persons who take great care of their stomachs. 4. In persons who have had previous attacks.

*Exciting.*—1. Very large quantities of food. In such cases the symptoms do not occur till the next day. This usually occurs in children. They suck too much milk, and if they do not vomit it, get gastric catarrh. 2. Indigestible food and in too large pieces. It is not the food itself, but the products of its decomposition which cause gastric catarrh. 3. Substances which have begun to decompose before entering the stomach, as spoilt meat, new beer, sour milk, or uncleaned babe's mouth; in the latter case it is the process of fermentation, and not the lactic acid, which causes cholera in infants. 4. Irritation of very hot or very cold ingesta, of alcohol, spices, of poisons, as tartar emetic and arsenic. 5. Substances that weaken the digestive power of gastric juice, as alcohol and narcotics. 6. Catching cold. 7. Sometimes catarrh is apparently epidemic.

*Anatomical appearances.*—The mucous membrane is reddened, the tissue relaxed, and covered with a layer of tough mucus. In experiments on one St. Martin it was found that the mucous secretion had an alkaline reaction. Softening of the stomach is often found after catarrhal inflammation, and is a post-mortem appearance. Rokitsansky holds softening not to be post-mortem. He speaks of two kinds—gelatinous and black. That the softening is a post-mortem appearance is supported by the fact that—1. It is always found in the fundus where acid contents are collected together, and at the pylorus when the position of the body sends it there. 2. Also found in chronic cases where there was no gastric disturbance found during life, but where easily fermenting substances were taken just before death. 3. Because though the walls are torn no signs of peritonitis existed during life.

*Post-mortem appearances.*—Slight inflammatory conditions during life leave no trace after death except in severe cases. In severe cases there is enlargement of epithelial cells and cells of mucous glands, and hypertrophy of the

Anatomical  
appearances.

submucous tissue; hæmorrhages upon the rugæ; softening and induration of the mucous membrane, with sloughing and even perforations. In cases of inflammation from corrosives as a result of a blow on the stomach soon after a meal, or an accident in young subjects, or after death from phthisis, there is intense congestion with destruction of the mucous membrane. The softening of the mucous membrane and of the rugæ is known as cadaveric softening. The most frequent site of softening is the fundus and the cardiac end of the stomach. This softening differs from that resulting from inflammatory conditions due to acids and corrosive substances; in the former there is absence of thickening, there is greater transparency, and absence of inflammatory changes into the surrounding parts, and should the perforation take place, the aperture has irregular and ragged soft edges.

Symptoms.

*Symptoms* of acute gastric catarrh with moderate fever. The stomach is disordered. Patients feel dull, fretful, hot or cold; there is pressing pain in the forehead a sense of weight, uneasiness, or pain on pressure at the pit of the stomach, in the lower part of the chest, and between the shoulders, with rigidity and retraction of abdominal muscles. The pain is increased on pressure and deep breath. This is soon followed by total loss of appetite, great thirst, retching, nausea, and vomiting. Vomited matters contain food with ropy mucus, which are due to abnormal decomposition of ingesta. In acute cases the pulse becomes frequent, and breathing difficult, prostration soon sets in; the tongue is furred and becomes red and glazed at edges; the bowels are loose; breath bad; the urine is scanty and high coloured, and contains urates; there is great restlessness, and often herpetic eruptions appear on the lips. In ordinary cases if patients fast for a day the symptoms disappear after a couple of pulpy stools. When more intense there is vomiting with much nausea,

and ingesta, with mucus, acid matters, and bile are brought up. Generally after vomiting and purging the patient gets well in a few days.

*Cholera morbus* is that form of acute gastric catarrh which extends to the intestinal mucous membrane and is characterised by profuse transudation of a fluid containing little albumen into the stomach and intestines. It prevails in hot weather and in summer, and attacks many people at once. At other times the attack is not so severe; it is excited by errors in diet. Rarely there are premonitory symptoms. It begins suddenly during night with pressure at the pit of the stomach, and is followed by nausea and vomiting. At first the last food eaten is vomited, and is but little changed. On vomiting again pale yellow or greenish bitter fluid is brought up. Borborygmi are followed by pulpy stools. Loss of water from blood causes intense thirst. Urine is diminished in quantity. Skin is dry; the patient is collapsed; nose is pointed, and eyes sunken. There are painful cramps, especially of calves of legs. When these occur the catarrh resembles Asiatic cholera. If at the time there be no epidemic and no cholera raging, the patient will recover. After a few hours the skin becomes warm again, and the patient though exhausted falls asleep.

*Cholera morbus.*

*Cholera infantum* is a catarrh in children which extends to the intestines. In them soon after sucking vomiting occurs, the milk is evacuated, and there is no longer curdling. In health the gastric juice would curdle the milk. The evacuations are acid, greenish, and lumpy. Vomiting and purging occur frequently, and the child cries from pain. Sometimes the children pick up and get well. If the disease goes on the child is emaciated, the body is mottled, and hands and feet are bluish. The belly hot, face and limbs cold. The child feels ill, but clutches at drink. Many die in a few hours. Great thirst

*Cholera infantum.*



is a main symptom. There is cyanosis and a sort of dyspnoea.

*Diagnosis.*—In poisoning there are scarcely such copious evacuations.

*Prognosis.*—Death in adults is rare. In children prognosis is very doubtful.

*Treatment.*—Give rest to the stomach. Watch the diet carefully in infants. The milk must be fresh. The milk of cows fed on oil cakes should not be used. It should be diluted with water for first three months. It should be given at regular but not too short intervals, and the vessels holding milk should be carefully cleansed. Casual indications may require an emetic where decomposed food keeps up the catarrh. Where injurious ingesta have passed into bowels give a purge of rhubarb and senna. If there be excess of acid in the stomach give soda carbonates. Where, in spite of all treatment, decomposing matter remains in the stomach and continues to aggravate the mischief give anti-ferments, as calomel and nitrate of silver. Nux vomica is also useful. Often opium alone or with bismuth does good.

Chronic  
gastric  
catarrh.  
Causes.

#### CHRONIC GASTRIC CATARRH.

*Causes.*—Occurs as a result of acute gastric catarrh. May be caused by—1, causes of acute catarrh, especially by alcohol, turpentine, and copaiba; 2, depends on congestion of the mucous membrane, as where the liver obstructs the portal vein, and where affections of the heart, lungs, and pleura cause obstruction of the vena cava; 3, it accompanies chronic diseases; 4, chronic organic affections, as cancer, ulcers, and other degenerations of the stomach.

Anatomical  
appearances.

*Anatomical appearances.*—The mucous membrane of the stomach is reddish-brown or grey, owing to the hæmorrhage (capillary) into the submucous tissue and the trans-

formation of hæmatin of blood into pigment. The mucous membrane is hypertrophied, and forms furrows, which are most marked at the pylorus. The inner surface is covered with tough firmly adherent grey mucus; very often the muscular and submuscular tissues are also thickened, their fibres are augmented in number, and take the place of the inter-muscular connective tissues. The pylorus is thickened from constriction of its walls or by hypertrophy.

*Pathology.*—*Congestion* leads to fermentive disorders, which interfere with the secretion of healthy gastric juice which is capable of dissolving food. It produces an unnatural secretion of ropy mucus and blood. When due to chronic lung, or heart or liver disease, the vessels of the stomach accommodate themselves to congestion, and no blood is effused. Pathology.

*Symptoms* are those of fermentive disorder. The patient complains of a feeling of oppression and fulness at the pit of the stomach, which is increased by food; the belly is puffed. The uneasiness is increased to pain several times in twenty-four hours. There are frequent eructations of gases, nausea, heartburn, water brash (a fluid formed in salivary glands), and occasional vomiting. The hydrocarbons are changed into a tough liquid substance like gum, which is thrown up as water-brash. This fluid is said to be formed in salivary glands and not in the stomach. If the food is vomited it is mixed with mucus, and acetic, lactic and butyric acids, which give it a disagreeable or sweet taste, sometimes the vomited matters may contain *sarcina ventriculi*. The appetite is almost lost, the tongue is foul, there is no thirst, the urine becomes scanty, high coloured, and deposits oxalate of lime and urates. It is often attended with catarrh of the intestines (diarrhœa) or jaundice from catarrh of the bile duct. The pulse is small; heart's action feeble; respirations slow; and temperature not increased. The skin is pale and dry. Other Symptoms.

symptoms are due to nervous disorders, such as headache, vertigo, mental depressions. When the disease is long continued the patient becomes anæmic and emaciated, and slight hectic fever appears. Such cases often lead to chronic ulcers. It is rarely fatal; often results in stricture of the pylorus. The presence of stricture or of any impediment to the exit of the contents of the stomach down into the intestine is known by vomiting, which takes place regularly every two or three hours after food; and by the vomited mass containing half-digested food, and mucus mixed with lactic and butyric acids, and very often a fungus known as *sarcina ventriculi*. This fungus resembles a bale of wool, and may be found in all diseases which cause fermentation by retaining food too long in the stomach. It is a proof of the existence of chronic gastric catarrh. Sometimes thickening can be felt; stricture, when established, is often fatal.

Treatment.

*Treatment.*—Attend to hygienic laws. Let the patient be properly clothed. Restore the stomach to its natural condition by use of remedies which restrain the unnatural secretion of mucus. No fermentives, as spirits, fat meat, or sauces, should be used; bowels should be kept regular, milk diet persevered in for some time, or give well-cooked meat in small quantities. The medicines or anti-fermentives are nitrate of silver, bismuth, oxalate of cerium, kino, logwood, sulphate of soda. In a few cases iron is indicated. Some use the stomach-pump and rinse out the stomach with soda-water. This often restores the tone. Chlorine, salicylic acid, and hydrochloric acid, are highly useful.

Croupous.

*Croupous* or *diphtheritic inflammation* is rare, except in typhus fever, or unless pseudo-membranous exudation is formed.

Phlegmonous.

*Phlegmonous* is also rare; may occur in typhus. In it the submucous tissue is infiltrated with pus; and there may

be abscesses. The inflammation soon extends to the muscular layer and the peritoneum. In this form there is pain in the epigastrium, vomiting, and high fever. The disease is fatal.

### CHANGES FROM CAUSTICS AND POISONS.

Changes from  
caustics and  
poisons.

I have thought it convenient under diseases of the stomach to give a short account of the different forms of poisoning.

The subject of poisoning properly belongs to forensic medicine, and I have merely introduced this abstract of the chief points detailed in works on forensic medicine (such as Guy), because the student in the diagnosis of the medical cases may occasionally wish to exclude the effects of noxious substances. A *poison* is said to be any substance or matter, solid, liquid, or gaseous, which, when applied to the body outwardly or any way introduced into it without acting mechanically, but by its own inherent qualities can destroy life. It should be borne in mind that hardly any poisons are truly instantaneous in their action—hydrocyanic acid is perhaps the only one. From this we may judge that as hydrocyanic acid was certainly unknown to the ancients it is probable that the sudden deaths attributed to poison were in reality due to aortic disease or cerebral hæmorrhage. In most cases of poisoning the symptoms appear suddenly in a person in good health soon after taking food, drink, or medicine, and in most fatal cases death happens in a few minutes, hours, or days. When given in full doses poisons act promptly, but when given in small and repeated doses the symptoms appear gradually. In poisoning vomiting and other symptoms of indisposition may set in after a wholesome meal, and other persons partaking of the same meal are similarly affected. There are certain poisons which leave in the dead body unmistakeable signs of their action. Thus mineral acids stain and corrode the parts with which



they come in contact, and oxalic acid corrodes the lining membrane of the gullet and stomach. Corrosive sublimate is decomposed by the secretions and mucous membrane of the stomach, and leaves a slate-coloured deposit of mercury. Arsenious acid also leaves a white patch clinging to the mucous membrane, which may be changed into yellow by sulphuretted hydrogen, the product of putrefaction. Phosphorus betrays itself by shining in the dark.

Corrosives.

*Corrosives* are characterised by their destructive local action or actions on the parts with which they come in contact. If they act on a large cutaneous surface they destroy life, as burns and scalds. When swallowed they destroy the lining membrane of the alimentary canal or of the windpipe, and caused death by shock, exhaustion or perforation, or by œdema of glottis or from starvation due to stricture of the gullet. Inorganic acids and corrosive salts and even oxalic acid have these effects in common. Any one of these poisons when taken causes a burning pain, with a strong acid, alkaline, or metallic taste. The poison rapidly spreads into the abdomen and is followed by vomiting and purging. Strong inorganic acids or alkalies and corrosive salts, or organic poison, as oxalic acid, produce inflammation, followed by adhesion, suppuration, ulceration, or gangrene of the stomach and intestines.

Irritants.

*Irritants*, as arsenic or cantharides, if taken, inflame the parts with which they come in contact. *Narcotics* or poisons, as opium, chloroform, or belladonna, which affect the brain, also affect the nerves of motion or sensation. Besides local actions, poisons have also a *remote action*, e.g. arsenic, when swallowed or applied to the mucous membrane of the stomach, gives rise to symptoms of acute inflammation of the membrane, as are present in cholera, and if arsenic be applied to a wound it equally sets up acute inflammation of the mucous membrane of the stomach and intestines. The presence of remote

effects of poisons often indicates the very poison itself, thus stupor points to the narcotic class, as opium, delirium to belladonna, paralysis to hemlock or digitalis, tetanic spasms to strychnia, antimony to the lungs, and lead to the muscular system.

The symptoms which are the constant effects of the poison just enumerated are also occasional symptoms of other poisons. Thus tetanus may also occur in morphia poisoning, as also in arsenic, or corrosive sublimate, or tartar emetic. It must always be borne in mind that besides these characteristic symptoms there are others always accompanying them in each case. Further, we well know that symptoms of poisoning are also symptoms of diseases. The poisons generally, by being inserted into wounds, or introduced into the stomach, or by absorption, circulate through the system and produce their effects. Symptoms.

All poisons destroy life in one of several ways. Some paralyse the heart, others act directly on the lungs, and cause death by suffocation, a third class attack the brain, a fourth the cord, and a fifth the whole capillary circulation. Those which affect the heart are salts of lime and magnesia, and of zinc, copper, lead, silver, and digitalis; those which affect the lungs are soda, hydrocyanic acid, and tobacco; opium affects the brain, strychnia the cord, ammonia the general circulation.

It is necessary to the action of poisons that they should always be absorbed, and in some, as hydrocyanic acid, the poison has produced its effects in a few seconds. It must be recollected that the more active poisons when taken in large quantities may destroy life by a sudden nervous shock.

The effects of poisons on the system may be modified Effects. in one of three ways. 1. Their quantity and form. 2. The part to which they are applied. 3. The condition of the body itself.

1. *Quantity*.—The larger the quantity of the poison the Quantity.

more prompt, and the more severe is its action if the whole or some portion becomes absorbed, but very often in such cases a major portion is completely discharged by vomiting. It is remarkable about the oxalic acid poison, that the acid in a very large dose may kill right off by shock, a smaller dose causes death by its action on the heart, in a yet smaller dose the cord is affected, and in an extremely minute dose the brain. In a similar manner the narcotico-acrids, when taken in large doses, act on the nervous system, in smaller ones on the stomach and bowels.

*Form.*

*Form.*—When in solution the effects are more active. They are rapidly absorbed by being brought in contact with a large surface. Volatile oils act with the same rapidity on the skin or lungs. Several poisons, which are insoluble in water, become so by acid juices of the stomach; this is the case with some salts of copper and of lead.

Those materials which act as ready solvents of poisons increase their activity, while those which form a coating over the mucous membrane of the stomach or envelope them have a retarding effect. Thus, in cases of opium, acids increase their absorption, whereas, oils, mucilage, albumen, or starch act as antidotes. Some antidotes, as hydrated sesquioxide of iron, charcoal, or magnesia have the protective effects of forming thick liquids, and their effect is due to their holding poisons in suspension.

2. The effect is most active if the poison be introduced into the wound, less so if applied to the serous membrane, still less to the mucous, and least of all to the unbroken skin. If injected into a vein the effect is extremely rapid. The effects of corrosives vary with the importance of the parts to which they may be applied. Thus, an acid applied to the glottis is very rapidly fatal, less speedy is the action if to the stomach, and least fatal if applied to the skin.

3. Several poisons, as opium, arsenic, alcohol, and tobacco lose their effects by long use. In India persons can take several grains of arsenic without any bad results, and opium could be borne where one tenth to one twentieth of their quantity would produce poisonous effects on an individual unaccustomed to their use. All these poisons when gradually introduced into the system, and for a long time, produce permanent injuries. Thus, alcohol causes diseases of the lungs, liver, kidneys, and brain. Opium ultimately injures digestion, produces emaciation, and weakens the intellect.

Conditions of  
body.

Some constitutions can bear certain poisons better than others. Thus, a few grains of mercury will salivate some very profusely, while on others it will have no effects. Again, on some opium acts as a purge, on others Epsom salts causes constipation.

In certain diseases, as in some fevers, alcohol can be well borne without poisonous effects. In dysentery and hæmorrhage large doses of opium are tolerated without bad symptoms. In delirium tremens half-ounce doses of tincture of digitalis can well be borne and with good results. During sleep both the body and mind are less active to the influence of poisons, and hence opium is given to induce sleep in cases of poisoning by arsenic.

For convenience the poisons are classified into organic and inorganic poisons.

*Organic.*—These are irritants affecting the brain, spinal cord, and lungs.

Organic.

*Inorganic.*—These are corrosives and irritants. The *corrosive* include mineral acids, as sulphuric, nitric, and muriatic, and alkalies, potash, soda, ammonia, and their carbonates. These poisons have solely a local action. They produce no specific remote effects. Have the effects of charring and destroying organic matters with which they come in contact. Thus, when taken into the stomach, or

Inorganic.



by contact, the mouth, tongue, and throat become brown, shrivelled, and corroded, and the lining membrane of the gullet is extensively sloughed. In such cases there are excruciating pains in the stomach soon after taking the poison; there is also vomiting of a brownish or black matter, containing mucus or shreds of lining membrane of the gullet and stomach. The inside of the mouth appears shrivelled and excoriated. There are discolored spots or streaks from the angles of the mouth. Death takes place from collapse; sometimes from suffocation.

Antidotes.

*Antidotes.*—In such cases chalk or plaster from the ceiling, and milk and oil are very valuable. The stomach pump should on no account be used.

Irritants.

*Irritants.*—These are salts of the alkalies and earths. They are weak poisons, and act only when given in large doses. They give rise to acute inflammation of the stomach and small intestines, and may lead to black patches in the stomach resembling gangrene. The symptoms are those of irritation of the stomach and bowels, with bloody stools and blood vomits. The urine also contains blood; they often lead to extreme prostration. Such cases get well under diluents and by promoting vomiting, and by the use of the stomach pump.

Irritant gases (as chlorine, nitrous acid gas, &c.) have the effect of irritating and inflaming the eyes, throat, and air-passages, and if inhaled without oxygen, they cause death by spasm of the glottis.

Phosphorus and iodine, though belonging to the class of irritants, have besides their local action other remote effects. These act as irritants to the stomach and bowels, and thus produce vomiting of mucus or bile, rarely blood, and also cause purging; they also cause extreme prostration. Phosphorus produces bloody and often gangrenous spots in the gullet, stomach, and intestines, with swelling and softening of mesenteric glands. Very often the contents of

the stomach or bowels are phosphorescent. Iodine produces besides symptoms of an irritant other nervous symptoms.

*Antidote.*—Use emetics and the stomach-pump in phosphorus poisoning. In cases of iodine any preparation of starch with emetic and stomach-pump is useful. Antidote.

*Metallic irritants.*—These are arsenic and its preparations, antimony, mercury, copper, zinc, tin, silver, iron, and their preparations. These when taken in poisonous doses act as irritants to the mucous membrane of the stomach and bowels. Some, as *arsenic*, also set up inflammation of the throat and gullet, and prove rapidly fatal by collapse, by coma, or by a long train of nervous symptoms. *Antimony* produces similar symptoms, but has in addition a characteristic pustular rash on the skin and in the throat. *Mercury* causes bilious and bloody vomit, often dysuria, or even suppression of urine, and cramps, twitches, or convulsions of limbs, and occasionally there is paralysis. Metallic irritants.

*Lead* or its preparations seldom act as acute poisons. The metal itself is not poisonous, but is acted on by acids, and thus imparts poisonous properties to wine and vinegar. It is also poisonous by combining with the contents of the stomach. It is a weak irritant, and in it instead of diarrhœa there is constipation.

*Salts of copper* are rarely used with homicidal intent, but they are occasionally taken by the suicide. The use of copper utensils in cookery sometimes leads to the mixture of its poisonous salts with food. The metal is not poisonous, but it readily oxidizes and combines with acids and acts as a poison. The symptoms are those of irritants, and the vomited matters are of a bluish or green colour. Other metallic salts have symptoms in common with those of irritant poisons.

*Post-mortem appearances.*—In cases of *arsenic* there is acute inflammation of the stomach, and the mucous mem- Post-mortem appearances.

brane is covered with patches of lymph and yellowish paste of arsenious acid. Ulcerations and perforations are rare. The inflammation extends to the œsophagus above and to the intestines below. In cases of *antimony* the inflammation is generally confined to the stomach, rarely extends to the throat or gullet. Sometimes there is inflammation in the lungs or in the brain. In cases of *mercury* the post-mortem appearances are intermediate between those of corrosive and non-corrosive irritants. They are corrosion, softening and sloughing and ulcers of the stomach and intestines. In a case of poisoning by *Goulard's extract* the whole of the alimentary canal was inflamed and the villous coat of the stomach appeared as if macerated. In poisoning by *copper* salts the stomach was inflamed, ulcerated, thickened and in part apparently gangrenous.

*Antidotes.*—In all these cases the treatment consists in removing the poison as promptly as possible from the stomach by means of emetics or by stomach pump, to be followed by milk alone or milk beaten with eggs, and given at short intervals. In the case of *arsenic* several preparations of iron, calcined magnesia, and animal charcoal, have been recommended. For *antimony*, after the stomach pump and other remedies adopted for arsenical poisoning, the best antidote is tincture of bark, or any preparations containing tannin, as strong green tea. For *mercury* the best antidote is albumen, gluten or wheat flour suspended in gum water, and white of eggs. The rest of the treatment is that proper to poisoning by the irritants generally. For salts of *lead* the antidotes are alkaline, or earthy sulphates, as epsom salts. For *copper* albumen and iron filings are recommended.

Narcotics.

*Narcotics.*—These are *opium* and its preparations, and morphia and its salts. When taken in poisonous doses they produce various nervous symptoms, as giddiness, drowsiness, and listlessness, followed by stupor and insen-

sibility. The patient lies as if in profound sleep, breathing is slow and imperceptible, with eyes shut, pupils contracted and insensible to light, the face flushed, and skin warm and moist. At first the patient can be easily roused, but in an advanced stage, with difficulty, and at length falls into a state of complete coma, with stertor and noisy respirations. Has a slow and full pulse, a pale and ghastly countenance, cold skin and livid hands and lips. There may be nausea and vomiting, and the bowels are confined. Death takes place from apoplexy, from collapse, or from apnœa or from convulsions.

*Post-mortem appearances.*—These are neither constant nor well marked. There is turgescence of the vessels of the brain, with or without serous effusion into the arachnoid, into the ventricles, and around the spinal cord. The stomach and intestines are healthy. The blood is in a fluid state.

Post-mortem  
appearances.

*Antidotes.*—The poison should be at once got rid of by means of stomach-pump and emetics. If the patient be comatose he should be roused by dashing cold water on his face, and should be kept awake by flicking the hands and feet with a towel. When he is beginning to recover give strong coffee. In extreme cases electricity and artificial respiration have been used. For collapse give ammonia internally and also apply it to the nostrils; for apnœa, warmth and frictions to the surface are necessary; for cerebral congestion a few leeches to the temple may be applied. Several agents which precipitate opium or its salts from solution are recommended. These are tannin and solutions of iodine and bromine. As narcotism is the common effect of opium, and delirium the leading symptoms of belladonna-poisoning, these are strongly contrasted conditions; and thus one poison proves an antidote to the other.

Antidotes.

*Delirants* form another class of organic poisons, and

Delirants.



include belladonna, hyoscyamus, stramonium, camphor, cocculus indicus, &c. These are characterised by their common effect of causing delirium, with illusions of the senses, and extreme dilatations of the pupils. Irritation of the stomach and bowels is present in a certain number of cases, and suppression of urine and dysuria are not less common. In the belladonna poisoning the delirium is sometimes pleasing, and is generally followed by spectral illusions.

**Treatment.** *Treatment.*—After the prompt use of emetics, animal charcoal infused through water or diluted liquor potassæ, and followed after a time by a full dose of castor oil are useful.

**Inebriants.** *Inebriants* include alcohol, ether, chloroform, naphtha, carbolic acid, turpentine, creasote, kerosine oil, &c.

These poisons have the common property of inducing a state of narcotism, often preceded by delirious excitement, and followed by indisposition, of which nausea and vomiting are generally the leading symptoms. In large doses they may destroy life by shock, but they generally prove fatal by producing a state allied to apoplexy, or by paralyzing the heart. They act as irritants to the parts with which they come in contact, thus producing intense inflammation of the lining membrane of the stomach, and of the air passages; but they do not affect the whole tract of the intestinal canal as the irritants. All these poisons are more or less volatile, and their vapours when inhaled act more powerfully than like quantities of the liquids themselves when swallowed.

Chloroform may be said to give rise to five successive effects. 1. Exhilaration. 2. Drunken drowsiness. 3. Profound sleep with contracted pupils. 4. Perfect insensibility. 5. Coma with slow breathing and dilated pupils.

In these cases the stomach pump should be used

without delay, and the cold affusion as a shock. If there be great congestion blood may be drawn from the arm, if apnœa be present treat it accordingly. As a last resource galvanism may be tried.

The next group of organic poisons includes convulsives, and these are nux vomica, strychnia, and bruccia. In these cases the symptoms are those of a feeling of suffocation and difficulty of breathing; followed by twitchings of muscles, and jerking movements of the head and limbs, ending in tetanic convulsions. The mind is generally clear to the last.

*Antidotes.*—Emetics and stomach pump at first, and then followed by inhalation of chloroform. Tannin and solution of iodine have been given, as they precipitate the poison of this class; animal charcoal, for absorbing them, and opium, or conium as counter poisons. Stramonium may be given with advantage. The differences between the disease tetanus and the symptoms of poisoning by strychnia have been already described in the former part of this work on diseases of the nervous system. Antidotes.

*Depressants.*—These are conium (hemlock), calabar bean, aconite, tobacco, and lobelia inflata. These poisons occasion a loss of power disproportionate to their effects on the heart, or on the nervous centres. Some of them are pre-eminently paralyzers of the muscles. Aconite has been classed as cardiac poisons, and tobacco and lobelia inflata, though powerfully depressant, have not so marked an effect on the voluntary muscles. Depressants

*Treatment.*—After emptying the stomach by emetics, a full dose of castor oil should be given to remove the poison from the bowels, and followed by diffusible stimulants. Treatment.

*Cardiac poison.*—Hydrocyanic acid, oxalic acid, and digitalis are the three organic poisons grouped together, and cause death by asthenia or shock. The first two Cardiac poison.

acids destroy life very quickly and the third digitalis has a slow action on the heart. The first two poisons strongly contrast one another, in the one there is absence of corrosive action, in the other it is present. Both agree in the production of sudden death.

## Antidotes.

*Antidotes.*—Chlorine and the mixed oxides of iron are antidotes for prussic acid. The one acts by withdrawing the hydrogen from the poison, the other by forming with it the insoluble Prussian blue. For the shock, dash cold water to the face, promote vomiting, and apply warmth to the surface. If the jaws can be opened use stomach-pump or an emetic. For oxalic acid the proper antidote is chalk. In the case of digitalis infusions containing tannin are useful.

## Asphyxiants.

*Asphyxiants*, as carbolic acid, sulphuretted hydrogen, &c., are organic poisons. These are poisonous agents applied to the air passages and cause suffocation as a leading symptom, they also give rise to headache, giddiness, drowsiness, insensibility, and failure of muscular power, and in exceptional cases to spectral illusions, delirium, and maniacal violence. In a concentrated form they cause spasm of the glottis.

## Treatment.

*Treatment.*—In these cases prompt removal of the patient to the pure air, and cold affusion to the face as a shock are essential. In case of apnœa, friction and warmth to the surface, and artificial respiration, and, in extreme cases, even galvanism may be tried.

## Vegetable irritants.

These *vegetable irritants* are divided into—1. Purgatives, as aloes, jalap, elaterium, croton oil, &c. 2. Abortives, as savine, ergot of rye. 3. Diseased vegetable and animal matters.

## Purgatives.

*Purgatives*, when given in large doses, and in old and infirm persons, act as a poison, owing to their oily or resinous ingredients. They cause irritation of the alimentary canal. The patient falls into a state of collapse

attended with drowsiness and slight nervous symptoms. In these cases diluents, liberal doses of opium and stimulants to counteract the collapse, are useful.

The *animal irritants* are cantharides and putrid animal matter. *Cantharides* has an energetic action on the urinary and generative organs, and the treatment consists of a free use of diluents and demulcents injected into the rectum and bladder. The *putrid animal matter* causes irritation of the alimentary canal, and is accompanied by symptoms of collapse or by symptoms of narcotism. An emetic is the best antidote. Diluents may be given with advantage. These poisons are only briefly noticed here. For fuller information the reader may be referred to works on Toxicology.

Animal irritants.

Name of poison.	Probably fatal dose.	Antidote.	Average fatal period.
<b>CORROSIVES.</b>			
<i>Mineral acids—</i> Sulphuric	Adult ʒj; infant (five weeks) ʒss	Calcined magnesia, chalk, whiting, plaster, milk, oil, or soapsuds; no stomach-pump	Shortest, 1 hour; child, immediately; average, 10 hours.
Nitric	Adult ʒij, less infant	Same as sulphuric acid	Infant, few minutes; adult, 1½ hour; average, 24 hours.
Muriatic	ʒss	Same as sulphuric acid	Shortest, 5½ hours; average, 24 hours.
<i>Alkalies—</i> Potash, soda, and ammonia	ʒss	Vinegar diluted with water, lime-juice and water, ripe fruits	Shortest, 3 hours; average, 24 hours.
<b>IRRITANTS.</b>			
<i>Alkaline salts and earth salts—</i> Nitrate of potash, sulphate of potash, bitartrate of potash, alum, chloride of sodium, salts of baryta	ʒj	Emetics, diluents, stomach-pump	Average, 3 hours.
Phosphorus	gr. i, or less	Aperients, diluents, gum	4 hours.



Name of poison.	Probably fatal dose.	Antidote.	Average fatal period.
<b>METALLIC IRRITANTS.</b>			
Arsenic	Solution, gr. ii	Hydrated sesquioxide of iron, magnesia, charcoal	2 hours; average, 20 hours.
Antimony (tartar emetic)	Adult, gr. ii; child, gr. $\frac{1}{4}$	Cinchona bark, strong tea (green), oak bark	7 hours.
Mercury (corrosive sublimate)	gr. iii	Albumen, gluten (wheat flour), milk, iron filings	$\frac{1}{2}$ hour.
<b>NARCOTICS.</b>			
Opium	Smallest, gr. iv	Tannin, strong coffee, sol. of iodine	$\frac{3}{4}$ hour; average, 12 hours.
Nux vomica	Powder, gr. xxx; extract, gr. iii	Sol. of bromine	$\frac{1}{4}$ hour; average, 1 hour.
Strychnia	gr. $\frac{1}{4}$	Inhalation of chloroform, tannin, sol. of iodine, animal charcoal, opium	Shortest, 10 minutes; longest, 6 hours.
Aconite	Root, $\mathfrak{zj}$ ; extract, gr. iv; tincture, $\mathfrak{zj}$	Animal charcoal	Shortest, $1\frac{1}{2}$ hour; longest, 20 hours; average, 4 hours.
Tobacco	$\mathfrak{zss}$	Stimulants, emetics	18 minutes.
Hydrocyanic acid	Pure acid less than gr. i, mxlv of acid (B. P.)	Chlorine, mixed oxides of iron	2 to 5 minutes.
Cyanide of potassium	gr. v	Ditto	$\frac{1}{2}$ an hour to 5 hours.
Oil of bitter almonds	20 drops	Ditto	Few minutes to $\frac{1}{2}$ an hour.
Oxalic acid	$\mathfrak{zss}$	Chalk, plaster, lime, and oil; no stomach-pump	10 minutes.
Cantharides	Tincture $\mathfrak{zj}$	Diluents, demulcents, opium	24 to 36 hours.

Simple ulcer  
of the  
stomach.

### SIMPLE ULCER OF THE STOMACH.

Excoriations or superficial ulcers which result in the ordinary course of gastritis, as a rule, undergo a spontaneous cure. In this part of the work we describe those ulcers which are deep-seated, whose origins are often obscure, and

which lead to serious symptoms, and even death. The chief clinical phenomena are :—localised pain, vomiting, hæmatemesis, emaciation, general debility, and symptoms of indigestion. The ulcer may heal and recovery take place, or may extend and lead to perforations and to fatal peritonitis, or to fatal hæmorrhage. Death may occur from want of nutrition (starvation).

*Causes.*—Predisposing: It is rare in children, more Causes. common in women than in men, in the proportion of two to one. It is rare before puberty. The poor are more prone to it than others. The habit of drinking, dissipation, and syphilis, all predispose to it. Exciting: various lowering diseases, suppression of chronic discharges, acute gastritis, and long-continued retention of irritants in the stomach.

*Pathology.*—Its sharp border, the absence of signs of Pathology. inflammation at its periphery, shows it to be due to partial necrosis, and to the formation of a whole slough, and not a gradual breaking down, as from inflammatory suppuration. The necrosis may be due to obstruction to the blood-vessels running into the gastric tissues and nourishing them. This nutritive obstruction may be an embolus; degenerative change in the arteries; extravasations into the submucous tissue of the stomach, causing pressure on nutrient vessels; mechanical violence as in retching; or disease of the coats of the vessels. The necrosis may also be due to destruction or rupture of the coats of the stomach as in mechanical violence by blows, or disease of the vessels. It is said that the alkaline blood always keeps a check on the destructive power of the gastric juice, and that fluids of the tissues of the stomach by thus neutralizing the effects of its highly acid secretions prevent necrosis. That when circulation is obstructed this check is removed, and ulcers result.

*Anatomical appearances.*—The perforating ulcers may Anatomical appearances. be met with in various degrees of destruction, beginning

with the mucous membrane and extending into the peritoneum. They are of various sizes, and may be circular or oval in shape. The edges are even and clean cut as if punched out, the margins well defined, there is no thickening, the mucous coat is destroyed through a large area, the submucous coat is also destroyed, but over a limited spot, and hence the ulcer is conical in shape, with its apex next the peritoneum. The base of the ulcer is generally smooth, or covered with slough.

*Terminations.* *Terminations.*—Gastric ulcers frequently heal without any thickness or the ulcer becoming puckered in the centre. In a few cases they remain quiescent or slowly extend, in others they may end in perforation into the neighbouring viscera or into a blood-vessel. The ulcers appear funnel-shaped, and granulations are sometimes seen on their surface. In many cases adhesions between them and the neighbouring tissues take place. These, when single, are usually circular or oval, but may become irregular from extension or coalescence of two or more. In size they vary from a quarter of an inch to an inch and a half in diameter, and from five to six inches in length. There may be one or many.

*Seat.* *Seat.*—The usual position of a simple ulcer is the posterior surface of the smaller curvature near the pylorus. These are known as perforating ulcers, and chiefly seated in the anterior wall and smaller curvature. In them there is no thickening, no adhesion, and when the ulcer is subjected to any disturbance, either by movement or distension of the stomach, they generally give way. These ulcers, if looked into from within the walls of the stomach, appear terraced, the loss of tissue being greatest in the mucous membrane. These perforating ulcers often open into the peritoneum and give rise to peritonitis, or the base of the ulcer previous to perforation becomes adherent to the neighbouring viscera, as liver or spleen, and thus

prevents perforation. In some cases the ulcers have proved rapidly fatal in ten days by perforation of the vessels and bleeding to death, by exhaustion, or from hæmorrhage.

*Seat of pain.*—The exact site of pain varies with the Seat of pain seat of an ulcer. In most cases the pain is complained of a little to the right of the epigastrium; if the ulcer be on the posterior surface, the pain is felt in the back, or on one side of the spine; change of posture and movement increases the pain, but often pressure, and occasionally food, relieves it. When an ulcer is near the cardiac orifice, vomiting is produced immediately, but when seated above the pylorus vomiting follows after some time.

*Symptoms.*—Very often patients die from peritonitis or Symptoms. hæmatemesis or from perforation before any symptoms of the presence of ulcers manifest themselves, but such cases are rare. In the majority of cases the patient suffers from pain, vomiting, and slight hæmatemesis. The symptoms show themselves very slowly. There may be at first distension of the stomach and flatulence after food, and slight anorexia; after a time the pain and vomiting appear. The pain is generally attended with tenderness, and may be referred to the spine between the tenth dorsal and second or third upper lumbar vertebra, or between the shoulder blades, or to the umbilicus. It radiates into different parts; it may be burning or shooting, and attended with soreness; the pain is increased by food, and comes on a few minutes after the food is taken, and lasts for about an hour. Vomiting is present, it generally sets in after the pain, is very persistent, and commences soon after the food is taken. The hæmorrhage which often takes place, may be from the congested mucous membrane, from the surface of the ulcers, or from the eroded vessels. There is aural catarrh, but the tongue is red and furrowed, but not furred. It is generally accompanied by thirst and constipation, sometimes little general disturbance, sometimes cachexia.



**Terminations.** *Terminations:* these are five,—1. Recovery, a general termination. 2. Incomplete cure occurs, in which ulcer heals but inconvenient adhesion remains. 3. In other cases perforation and death from peritonitis. There is sudden terrible pain, skin cool, pulse small, countenance sunken, and collapse. 4. Rarely death from hæmorrhage into the stomach. 5. Death from gradual exhaustion preceded by constant vomiting.

**Treatment.** *Treatment.*—Be careful to avoid overloading the stomach by food. It is necessary to give rest to the stomach, to support the system, and to relieve urgent symptoms. The diet should be regulated, and stimulants should be avoided. Avoid also hot liquids, as hot tea or coffee. If perforation exists all that can be done is to give opium in full doses and for several days. Nitrate of silver and bismuth may be tried; counter-irritants are useful.

**Ulcer of the stomach.** *Ulcer of the Stomach* was not known to physicians till demonstrated in the present century, but the case of the Duchess of Orleans, sister to the first English owner of Bombay, illustrates in perfection one phase of the disease, and has been so admirably analysed by M. Littrè that I cannot resist the temptation of placing a short account of his admirable essay before the readers in India. Henrietta Anne, Duchess of Orleans, daughter of King Charles I, and sister of King Charles II, died suddenly at the French Court after a few hours' of extreme agony setting in without any obvious cause. She is celebrated by Bossuet in one of the most splendid orations in the French language, and it was the repeated perusal of this famous declamation which led M. Littrè to endeavour to ascertain whether the suspicion stated by many historians that the princess was poisoned was true or not. The facts of the case as stated by an eye-witness were these: On the 29th of June, 1670, the Duchess of Orleans dined as usual, and after dinner she lay down on one of the couches as she often did, and I sat

down beside her, so that her head was resting on me ; she fell asleep. During her sleep I noticed a very extraordinary change in the appearance of her face ; I had often watched her sleep, and was familiar with the amiable expression which she had at that time. This was changed for one of extreme severity. After she had arisen she walked into the drawing-room, but with so cross an expression that the Duke was surprised, and remarked it to me. She walked up and down the drawing-room with the Duke's treasurer, and several times said to him she had a pain in her side. Soon after this a glass of chicory water was brought to her, which she had asked for some little time before ; she drank it, and as with one hand she put down the cup, she put the other hand on her side and said in a tone of voice showing the greatest distress, " Oh what pain in the side, what pain, I cannot bear it any more," she reddened in pronouncing these words and the next moment she became of a livid pallor which astonished us all. She continued to cry out, and said that she must be supported or she could no more hold herself up. We put our arms round her and she walked with great pain, and bent double. She was undressed in an instant, she constantly complained, and I noticed that she had tears in her eyes, which astonished and touched me, for I knew her to be a person of the greatest fortitude. I said to her that I feared she suffered very much, and she said to me that the pain was inconceivable. She was placed upon a bed and when she was there she cried even more than before, and threw herself from one side to the other as a person suffering intensely. Her chief physician came and said it was the colic, and prescribed the usual remedies. The Duchess said that she was sure that her illness was something more considerable than what they thought, and that she was going to die. All that I have told passed in less than half an hour. The Duchess kept crying out that she felt excruciating

pain in the pit of the stomach, medicine which was given to her made her vomit, but she brought up nothing but a little phlegm and some partly digested food. The agitation produced by this and by her intense pain was succeeded by an abatement, which seemed to us like repose, but she said to us that we must not mistake it, that her pains were as bad as ever, but she had not strength to cry out, and that there was no cure for her illness. She heard us say that she was a little better; that is so little true, said she, that if I were not a Christian I would kill myself, so intense are my pains. We ought not to wish ill to any one, added she, but I do wish that somebody could feel for one moment how I suffer that they might find what my agonies are. A little soup was given to her and her agonies were immediately redoubled, and became more violent than they had been after she had taken the glass of chicory water. Very soon after this the approach of death was obvious in her face, and after two or three slight convulsive movements of her mouth she died at half past two in the morning, and just nine hours after the commencement of her first symptoms. M. Littré proceeds to point out how completely this case illustrates the features of simple ulcer of the stomach terminated by perforation immediately due to the glass of fluid, and acute peritonitis following the perforation. He points out how the fact that the intense and immediate pain in the stomach, while the mouth and the œsophagus are altogether unaffected, excludes at once a corrosive poison. The body was examined post mortem, and the report of an English surgeon who was present at the examination is extant. He describes with perfect fidelity the appearances of acute peritonitis, and even ruptured ulcer, but he thought that the opening must have been caused by the knife of the surgeon who opened the body, and while all his observations are exact, fails, owing to the deficiency of pathology in his day, to draw, to us, obvious

conclusions. M. Littré, by putting together the account of the symptoms and the notes of the post mortem, has conclusively proved that the duchess was not poisoned, and his essay may justly be recommended to the student as at once an admirable account of ulcer of the stomach, and a perfect specimen of the analysis of medical evidence.

## CANCER OF THE STOMACH.

Cancer of the stomach.

The stomach is one of the most frequent internal organs affected by cancer, and the cancer is usually primary. Scirrhus, medullary, and colloid cancer all occur.

*Causes.*—Cancer of the stomach is more common in men Causes. than in women; the liability is greatest between the ages of sixty and seventy-five; it is often hereditary, chiefly found in the pylorus, rarely at the fundus or at the great curvature, and has a tendency to spread over a greater or less area of mucous surface and transversely. Scirrhus is the most common, next medullary, least often colloid.

*Scirrhus.*—It begins in the submucous tissue, and causes Scirrhus. induration and thickening. It then spreads into the deeper coats of the mucous membrane, and is incorporated with the growth. It has an irregular appearance, sometimes shows itself in small nodules, and at others it may become diffused into a dense and hard mass. The mucous membrane is at first united with the subjacent growth and soon softens into a black sloughing pulp, which separating leaves the cancer exposed to view. The muscular coat is generally hypertrophied and degenerated, and the intermuscular septa form scirrhus bands; at last the serous coat is thickened and clouded with nodules. There is often local peritonitis. Sooner or later it leads to the destruction of the other membranes, the cancer itself sloughs, and excavations and ulcers with irregular hard edges are formed.

*Medullary or encephaloid.*—In this variety the tumour Medullary or encephaloid. is of rapid growth. Its nodules on the thickened mucous



membrane are soft and look like brain substance. On pressure cancer juice oozes out. It rapidly spreads from the inner surface of the stomach, from the muscular and the outer coat, and projects in nodules as bleeding excrescences. The growth has a tendency to break down into a soft black sloughy mass which, on separating, leaves an excoriated ulcer, surrounded by elevated, everted, cauliflower-like edges. Such an ulcer often covers eight square inches. In some these tumours give rise to villous vascular growths.

Colloid.

*Colloid* is rare ; when present it resembles in form weals as in urticaria, appears in nodules, and is frequently diffused. It begins in the submucous tissue, but soon induce degeneration of the coats. The tumour consists of innumerable small cavities containing gelatinous fluid. Microscope shows cell formation of gelatinous cancer. The mucous membrane is destroyed, and the alveolar matter evacuated. Its free surface is ragged, but loss of substance is never very deep ; for while the destruction is going on, there is a new production below the degeneration. The cancer often extends to other organs, and more especially to the lymphatic glands, the pancreas, the liver, the transverse colon, and the omentum. Very often it causes adhesion of the stomach with other organs. Occasionally it leads to perforation into other hollow viscera and peritonitis results.

Seat.

*Seat.*—The seat of cancer influences the shape and size of the stomach, and also the contraction of its walls. Cancer is chiefly seated at the pylorus, and in such cases the stomach is dilated, and its walls hypertrophied. The duodenum also suffers. When cancer is at the cardiac end, the stomach is contracted and small, and the œsophagus is dilated and hypertrophied. When the cancer is seated at the middle portion of the organ, the stomach assumes the form of an hourglass *contraction*. When the cancer is along the curvature it always distorts the stomach by drawing the orifices together.

*Symptoms.*—Local and general. Cases occur in which diagnosis is impossible during life. Cancer is always accompanied with marasmus and little else, and may lead one to suspect it, by chronic catarrh with dyspepsia. Thus, in some cases the symptoms are those of chronic gastritis, or of ulcers, or of dyspepsia with rapid wasting. Symptoms are so well marked that they can hardly be mistaken for any other affection. These are dysphagia, cachexia, general marasmus, capricious appetite, vomiting, and pain. The pain with tenderness in the stomach is increased on taking food, but is not so severe as in cases of gastric ulcers or in cardialgia. Generally there is vomiting after every meal. If the cancer be seated at the pyloric end or at the cardiac orifice, it is less frequent than if it is seated in small curvature. In advanced cases of cancer vomiting after a time ceases, this is owing to the degeneration and atony of the walls of the stomach; if cancer be at the cardiac end vomiting takes place at once. In case of the pylorus, vomiting occurs several hours after food, and the vomited matters at first contain food, mucus, and sarcina ventriculi, or *Torula cerevisiæ*, also cancerous elements and a sour liquid. Later on the vomiting is often like coffee grounds, being mixed with bile from ducts and blood due to capillary hæmorrhage. There may be eructations. The most important of all the symptoms is the tumour in the epigastrium. Sometimes this may be absent. When present it may be felt at the pyloric end, and is best known by its size and feeling of sensitiveness, all the other symptoms progressing regularly, as vomiting, obstinate constipation, and extremely rapid emaciation.

*Terminations.*—Death may occur from exhaustion, or from hæmorrhage in the stomach, or from perforation and subsequent peritonitis. There is no fever. Often œdema of legs from thrombosis of femoral vein occurs.

*Diagnosis.*—It is often mistaken for chronic ulcers of

the stomach. For simple ulcers. 1. *Age*.—Youth excludes cancer. 2. *Duration*.—Long duration is usually against cancer. 3. *Condition*.—Is little affected in ulcer, in cancer it is impaired early. 4. Occurs in males at an advanced period of life and is hereditary, not so with ulcers which occur in females, and at puberty. 5. Pain is more constant, and not affected by food or by vomiting. The tenderness is slight or may be absent. In ulcer the pain is relieved after vomiting, and there is tenderness. 6. Hæmorrhage in ulcer is in large quantities and little changed. 7. In cancer digestion is disturbed from the first. There is rapid and considerable wasting, also cancerous cachexia and existence of a tumour at or near the pylorus. Also in cases of cancer at the pyloric orifice, there will be dilatation of the stomach; but the absence of dilatation does not disprove the presence of cancer. Variety can rarely be determined during life. Colloid is probable when the disease is very slow and ascites present, particularly if after tapping for ascites there are nodular masses in the omentum. If the course be more rapid the medullary form is more probable.

Treatment.

*Treatment*.—Is of little avail owing to the extremely rapid progress of the disease; its continual progress rapidly exhausts the powers of life. The treatment can only be palliative. Opium is the only remedy in such cases. The stomach should be kept at rest, and urgent symptoms such as vomiting may be allayed by suitable remedies as sucking of ice and creasote. The diet should be regulated, and nutrient enemata may be tried.

Spasm of the stomach.

#### SPASM OF THE STOMACH.

*Spasm*.—Is a painful affection not dependent on any structural change. It occurs in anæmic persons as in chlorosis, in diseases of the uterus, in diseases of the spinal cord and the brain; cases of dyscrasia; excessive acidity; certain medicines, and cold drinks also lead to it.

*Symptoms.*—The pain occurs in paroxysms, and the intervals are of complete freedom. There are gripes, pallor, faintness, cold extremities, intermittent pulse, the epigastrium is puffed out, but pressure can be well borne. When the attack occurs it lasts for about half an hour. Symptoms.

*Diagnosis.*—Character of pain is no guide. Distinguished from simple ulcer by, 1. Pressure increases the pain of ulcer, which is diminished in spasm. 2. In ulcer, dyspnœa is common; none in spasm. 3. Chlorosis, dyspnœa, &c., point to spasm, but in such cases ulcers are also common. 4. Presence of other neuralgias point to spasm. 5. In spasm there is pain even when the stomach is empty, in ulcer the pain is generally after food. Diagnosis.

*Prognosis* depends upon the cause. Prognosis.

*Treatment* of symptoms as in chlorosis. Give iron. During the spasm give nux vomica, and even narcotics. Belladonna plaster on the stomach is useful. Treatment.

### OBSTRUCTION OF THE STOMACH.

*Pyloric induration or fibroid infiltration* consists in the abnormal development of fibrous and submucous areolar tissue of the pylorus, leading to obstruction. The obstruction may be at the pyloric or the cardiac orifice. Obstruction of the stomach.

*Causes of obstruction.*—Organic disease of the orifices. presence of tumours or cancer, cicatrization of ulcers due to necrosis, or to contraction of chronic gastric ulcers, or, as in old people, to repeated irritation of the pylorus by raw spirits, &c. Causes of obstruction.

*Morbid appearances.*—The walls of the pylorus are thickened, and converted into fibro-cartilaginous tissue, and there is contraction of the orifice. The stomach is dilated, and its muscular walls hypertrophied. Morbid appearances.

*Symptoms* are the same as those of cancer of the pylorus; the effects of corrosives lead to hypertrophy of its coats; any cause as fibroid infiltration; all give rise to its spas- Symptoms.



modic contraction. The obstruction may be due either to irritation of an ulcer in the neighbourhood, or to external pressure as of the pancreas, cancer of the liver, enlarged glands. The obstruction may be at the cardiac orifice, and gives rise to dilatation with hypertrophy of the œsophagus, and contraction and atrophy of the stomach. In pyloric obstruction there is dilatation of the stomach, with hypertrophy of its walls, and contraction of the intestines. In the latter case, the food passes into the stomach, but causes gastric uneasiness and leads to vomiting. In the case of pyloric obstruction vomiting comes on some hours after food, or only at intervals of a few days, a great quantity being then discharged. Vomited matters are highly acid, and are fermented, and contain sarcina and torulæ. If vomited matters are discharged shortly after ingestion, they consist of partially digested food and other normal secretions of the stomach. If, after a long interval, they have undergone putrefactive changes, are foetid, abnormally acid, and contain sarcina or they east fungus, or both. The appetite also suffers, but frequently the patient can take food. The abdomen is more or less distended, and the diaphragm is pushed upwards.

In cases of obstruction at the cardiac orifice, there is inability to swallow food, and vomiting follows the effort. The food, if taken, is immediately rejected by eructations, and not by vomiting, it only passes into the œsophagus. The appetite is good, but the patient cannot take food, and suffers from starvation. In cases where food is not immediately rejected, it remains in the œsophagus and there it undergoes putrefaction or fermentation, and is mixed with the œsophageal mucus. In these cases the stomach is contracted and there is shrinking at the epigastrium instead of distension, as in the pylorus.

Treatment.

*Treatment.*—This varies with the cause, and with the seat of obstruction. If at the pyloric orifice the stomach must

be frequently emptied by means of a stomach-pump. The food should be given in small quantities at a time, and in a fluid form. Avoid putrefaction by antifermentives; if obstruction be due to some disease of the pylorus, feed the patient by the rectum. In cases of cardiac obstruction bougies, if carefully passed, may be useful. Where bougies are of no avail, feed the patient by an enema or through an artificial opening made into the epigastrium.

#### DILATATION OF THE STOMACH.

*Dilatation of the stomach* is that condition of the stomach in which there is obstruction at the pyloric orifice preventing the food from passing into the duodenum. The stomach thus gradually and slowly dilates, till at last it appears as a tumour in the cavity of the abdomen. Very often from flatulence or tympanites, or from fluid, the stomach may appear full and dilated.

Dilatation  
of the  
stomach.

*Morbid appearances.*—Distension of the stomach is known by its situation, peculiar form, by the peristaltic movements, and by percussion giving a peculiar resonance of a cavity containing fluid and air. The organ is much distended, a peristaltic movement is observed, extending downwards across the abdomen from the left to the right, often to the right iliac fossa. The shape and size of the stomach and its movements can be detected by percussion. When the stomach contains fluid a splashing sound is produced. Percussion determines abnormal limits, there being resonance over a large area when the stomach is empty, and dulness when it contains solid or liquid food.

Morbid  
appearances

*Symptoms.*—The patient suffers from vomiting, from pain and oppression at the pit of the stomach, from flatulence and pyrosis; the appetite is voracious. The vomiting is copious and frothy owing to fermentation. It is very sour, and resembles yeast. Under the microscope

Symptoms.

the vomited matters contain *sarcina ventriculi* and the yeast fungus (*Torulæ cerevisiæ*). The *sarcina* are also found where the food is long retained in the stomach and decomposes, as in ulcers and in contraction of the pylorus.

Treatment.

*Treatment*.—I have met with great success by emptying the stomach by means of the stomach-pump, and washing it out with sulphur salts.

### HÆMATEMESIS.

Hæma-temesis.

*Hæmatemesis* is a symptom of many gastric and hepatic disorders, and signifies vomiting of blood. The blood is vomited in large quantities, is not frothy, is sometimes mixed with food, and is dark coloured from being mixed with gastric juice. In this condition blood is often passed in the stools, and there is more or less nausea preceding it.

Causes.

*Causes*.—There are three varieties : 1, Rupture of over-filled blood-vessels without change of structure. 2. Rupture, with change of structure of the vessel. 3. Erosion or other injury to the walls of the vessels.

Varieties.  
Arterial  
fluxion.

*First variety*.—Arterial fluxion is rare. It may be vicarious, or may be due to poverty of the blood, as in scurvy, or to arterial or passive venous congestion. The congestion may result from impediment to circulation in diseases of the liver, as obstruction of the portal vein by blood clots, or in cases of pressure on the branches of the pulmonary veins due to cirrhosis or to enlargement of gall-ducts from some obstruction to common duct. The congestion often leads to destruction of capillaries, to yellow atrophy of the liver, to hyperæmia of the gastric mucous membrane, or to diseases of the heart and lungs, &c. The hæmorrhage of new-born babes is of this class.

Rupture of  
the vessels.

*Rupture of the vessels* is common in hæmorrhagic diathesis after typhoid and yellow fever, and other severe diseases, as scurvy. It may be aneurysm of the abdominal

vessels opening into the duodenum, or opening of the varices.

*Erosions.*—Simple ulcers of the stomach, as ulcerations of a cancer, or from corrosive and irritant substances, or foreign bodies, &c. *External violence*, as a blow or wound upon the epigastrium. Erosions.

*Anatomical appearances.*—Often during post-mortem examination it is hard to find any source of hæmorrhage, sometimes circumscribed capillary hæmorrhage is found in the mucous membrane, with superficial softening and shallow erosions. The erosions may be small, round, or elongated openings found on ridges of the mucous membrane and where a large vessel has been eroded the mouths are gaping, very often dark clots of blood are found close to their orifices. Anatomical appearances.

*Symptoms.*—If the hæmorrhage be not abundant, and if blood be not vomited, it cannot be recognised during life. In the case of a St. Martin small hæmorrhage occurred during acute gastric catarrh, and the coffee-ground vomit had little effect on the condition of the patient. When the hæmorrhage is large in quantity some symptoms precede hæmorrhage and depend either on the stomach being full of blood or the general emptiness of blood-vessels of the body. The patient feels faint, and may even die from syncope. When in moderate quantity the patient complains of pressure about the stomach. There is nausea, with pallor of the face; the skin is cool; he sees specks before the eyes, has noises in the ears, and feeling of giddiness and fainting, and has a sweetish or saltish taste in the mouth. These symptoms are rapidly followed by vomiting of food mixed with small quantities of blood, or of blood alone if the latter enters the larynx, and then it is coughed up. Very often the blood passes into the bowels, and is passed with stools. In all these cases fainting is always favourable; further hæmorrhage is checked and coagulation promoted. Very few persons die Symptoms.



immediately from its effects. There is great exhaustion with gradual convalescence. Patients become dropsical, and the vessels are refilled. The dropsy passes off, or the patient may die right off.

Diagnosis.

*Diagnosis.*—*Characters of blood ejected.*—It is non-aërated, brown or black in colour, grumous, coffee-ground like, and tarry, mixed with food, and acid in reaction. The clots are irregular, firm, and heavy. Blood if only a short time in the stomach may be bright and red.

Treatment.

*Treatment.*—In congestion hæmorrhage does good. In scurvy it does harm. In cirrhosis apply leeches to the anus as prophylactic. Rest to the body and stomach, and nutrient enemata by the rectum are necessary. Urgent symptoms should be combated.

### *Diet Scale.*

<i>Meals.</i>	<i>Full Diet (Meat).</i>	<i>Half Diet (Meat)</i>	<i>Broth Diet.</i>	<i>Milk Diet.</i>
Breakfast	1 pint of Tea. Bread and Butter.	1 Pint of Tea. Bread and Butter	1 Pint of Tea.	1 Pint of Tea.
Dinner.	$\frac{1}{2}$ -lb. Meat when dressed. $\frac{1}{2}$ -lb. Potatoes. Bread and Beer.	$\frac{1}{4}$ -lb. Meat when dressed. $\frac{1}{2}$ -lb. Potatoes. Bread and Beer.	$1\frac{1}{2}$ Pint Broth. 6 ozs. Potatoes (mashed). Bread.	$1\frac{1}{2}$ Pint Milk, or 1 Pint Milk with Arrow Root, Rice or Sago. Bread.
Tea	1 Pint of Tea. Bread and Butter.	1 Pint of Tea. Bread and Butter	1 Pint of Tea. Bread & Butter.	1 Pint of Tea. Bread & Butter.
Supper.	Bread and Butter. Beer.	Bread and Butter. Beer.	Bread & Butter. Gruel.	Bread & Butter. Gruel.
Daily Allowances to each Patient.	2 Pints of Tea. 14 ozs. Bread. $\frac{1}{2}$ -lb. Meat when dressed. $\frac{1}{2}$ -lb. Potatoes. 2 Pints Beer ( <i>Men</i> ) 1 Pint Beer ( <i>Women</i> ). 1 Ounce Butter.	2 Pints of Tea. 12 ozs. Bread. $\frac{1}{4}$ -lb. Meat when dressed. $\frac{1}{2}$ -lb. Potatoes. 1 Pint Beer. $\frac{3}{4}$ -ounce Butter.	2 Pints of Tea. 12 ozs. Bread. $1\frac{1}{2}$ Pint Broth. 6 ozs. Potatoes (mashed). $\frac{3}{4}$ -oz. Butter. Gruel.	2 Pints of Tea. 12 ozs. Bread. $1\frac{1}{2}$ Pint Milk, or 1 Pint Milk with Arrow Root, Rice or Sago. $\frac{3}{4}$ -oz. Butter. Gruel.

*In water free food this Table may be stated as follows :—*

Full Diet.	Albuminous substances.	Fatty substances.	Carbo-Hydrates.	Salts.	Total.
Bread, 14 ounces ...	2·870	·490	—	·224	3·584
Meat, 8 ounces ...	·64	·187	3·922	·104	4·883
Potatoes, 8 ounce ...	·12	·01	1·87	·10	2·100
Butter, 1 ounce ...	·003	·919	·002	·004	·928

For other diets the water free food may be computed in proportion.

## DISEASES OF THE INTESTINES.

### INTESTINAL DIGESTION.

*Intestinal digestion* includes the functions of the intestinal canal and secretions of the pancreas and liver.

Intestina  
digestion.

*Anatomy of intestines.*—The intestinal canal is divided by ileo-cæcal valve into small and large intestines. The small is about twenty feet in length, and disposed in coils in the centre of the abdomen. The large intestine is about five feet in length, and describes a horse-shoe-shaped bend round the small intestine. The small intestine is further divided into duodenum, jejunum, and ileum. The ileum terminates into large intestine. The large intestine begins in right iliac fossa in a pouch called ileo-cæcal valve. This pouch gives off from its lower end an appendix called the appendix vermiformis. The large intestine terminates in the rectum. The walls of the intestine are composed of an external serous coat, next the muscular coat, then the sub-mucous coat (areolar tissue), and the most internal the mucous coat. The mucous coat of the intestine is composed of valvulæ conniventes and villi, and also glands of various kinds,—viz. Brunner's glands, the follicles of Lieberkühn, the solitary glands, and Peyer's patches.

Anatomy of  
intestines

Valvulae  
conniventes.

*The valvulae conniventes* are only found in small intestines, they begin a little below the pylorus and extend as far as the upper half of the ileum. They are largest in the duodenum and the jejunum.

The villi are important absorbing agents; they also belong only to small intestines. These begin at the upper part of the duodenum, and terminate at the free edge of the ilio-cæcal valve; thus only covering the surface of the valve which is directed towards the ileum, that towards the cæcum is devoid of villi.

Brunner's  
glands.

*The Brunner's glands.*—These are only found in the duodenum, and are also called duodenal glands. They are most numerous near the pylorus, and are from  $\frac{1}{8}$ th to  $\frac{1}{10}$ th of an inch in diameter. The *follicles of Lieberkuhn* exist throughout the whole length of small and large intestines.

Solitary  
glands

*The solitary glands* are closed sacs, imbedded in the mucous membrane, are scattered over the whole length of small and large intestines, but are numerous in appendix cæci, and in the large than in the small intestines, and are about the size of a mustard seed. Under the microscope they consist of nuclei, cells and granular matter.

Peyer's  
patches.

*Peyer's patches* are collections of solitary glands clustered together, into circular oval or oblong patches. These are found only in the small intestines, and in those parts which are most remote from mesenteric attachments. They are about twenty in number. Increase in size as traced downwards, and in the lower part they measure, in their long diameter, as much as from two to four inches, in jejunum their greatest measurement being half an inch. They are larger and more numerous in the ileum.

*The secretion* from these glands is called the intestinal juice. The juice is a colourless, viscid, alkaline fluid, having the power to convert starch into sugar, and of emulsifying fatty matter. It also exerts a solvent influence upon nitrogenized substances.

*The pancreas* or sweetbread is a flattened elongated gland, stretching across from the upper part of one side of the abdomen to the other; the left extremity being pointed. In appearance it resembles the solitary glands, consists of a duct which occupies a central position, and passes from left to right obliquely and through the duodenum in which it terminates in an opening. Its secretion, like the gastric juice, flows only when the food is ingested. The juice is a transparent, colourless, odourless and viscid liquid, of saline taste, and alkaline reaction. When exposed to heat it coagulates; it also coagulates by the addition of alcohol and mineral acids.

Pancreas.

*Intestinal digestion.*—The food after it passes the stomach enters the intestines and its conversion is known as chyle. Here the chyle mixes with various secretions. Its starch is converted into sugar, and absorbed by the blood-vessels of the liver. Its fat is emulsified and absorbed by the villi and poured into the lacteals. The great portion of the insoluble food also becomes dissolved by these secretions. The chyle is fluid at first, but as the absorption proceeds onwards, and in the large intestines, where the absorption preponderates over exudation, the chyle acquires a solid consistence before it is being expelled as fæces. In the stomach the colour of its contents depends upon the nature of the food. In the duodenum the food is brought in contact with bile, but the colour is obscured, owing to its mixture with the opaque, white, emulsified fatty matter of the bile, and also to the precipitation of its resinous matter. In the lower part of the small intestines, a great portion of the aliment is absorbed, and therefore the remainder has a deep yellow colour, owing to the colouring matter of bile. In the large intestines, the yellow colour changes into brown. In cases where bile is prevented from reaching the intestines, as in jaundice, the dejections are of a *clay* colour.

Intestinal digestion.



The *odour* of the fæces agrees with the specific odour of the body, and appears in various degrees of intensity, and is derived from the blood. There are various *gases* in the alimentary canal, of these oxygen and nitrogen are derived from the air being swallowed with the food; other gases are formed by changes in food or secretions, or in products for elimination.

The period of time required for the transit of any matter through the intestinal canal varies from two hours to twenty-six. In diarrhœa the transit occupies only two hours; in cases of obstruction it may be weeks. The collection of fæces in the lower part of large intestines produces an impression and a desire for its expulsion. Habit has made the desire to occur once in twenty-four hours. Where the habit is not responded to, and an accumulation is allowed to ensue, the rectum loses its muscular tone and the power for expulsion becomes less. This leads to a host of miseries as dejection of spirits, derangements of stomach and liver, and hæmorrhoids.

The fæcal matter consists of articles which are not dissolved by the secretions poured out for digestion; many articles even of a digestible nature escape from absorption, as starch, fat, vegetable matters, &c., and mix with various products derived from the alimentary canal itself, such as epithelium, mucus, colouring matter of bile; but so long as there is normal muscular contraction of intestines health is maintained. Diarrhœa, and cramps or colic are irregular or unnatural contractions of muscular fibres of the intestine. The cramps are also called bellyache or gripes. If cramps are not soon overcome acute inflammation of the whole bowels or of small intestine results. These irregular contractions often lead to intussusception.

As with irregular muscular contractions so with accumulation of gases. If the collection of gases be inordinate, it gives rise to uneasy sensations known as flatulence or

tympanites. Borborygmus is the movement of the flatus in the intestine, accompanied by a rumbling noise. In many cases the fibres of the colon contract round the flatus and give rise to swellings known as phantom tumours. Where the distension is general, a swollen, resonant, and drum-like state of the abdomen is produced, known as tympanites. When the intestines are very weak they are unable to expel the gas, and it therefore becomes a source of great misery and alarm.

Diarrhœa, cramps, and flatulence are also the result of fermentation. Where digestion is not entirely completed in the stomach, the fermentive action takes place in undigested food after it has passed the pylorus. During health the mucus secreted by the gland follicles of the intestines assists further digestion, where this is not effected fermentation is the consequence. Like gastric juice bile is an acute fermentive agent controlling and preventing putrefaction. The food after it has passed the stomach and entered the duodenum or the jejunum is highly acid, owing to the predominance in it of acids of the stomach. The acid greatly diminishes and even disappears as it reaches the cæcum. In the large intestine the contents are generally alkaline being only acid in some parts. If the food in the intestine undergoes putrefaction, gas is evolved, and flatulence and tympanites, uneasy sensations in the bowels, as colic, and even spasmodic pain from the irritation or obstruction of the bowels result. Further irritation of the bowels leads to increased mucous secretion, and to diarrhœa and vomiting. In such cases anti-ferments, as calomel and nux vomica act wonderfully by promoting the secretion of bile.

#### INTESTINAL FLATULENCE. TYMPANITES.

*Intestinal flatulence* is a result of deranged action of the intestine. There is undue accumulation of gas.

Intestinal.  
flatulence.

**Causes.**

*Causes.*—1. Air swallowed. 2. Products of decomposition of the contents of the stomach and bowels. 3. Exhalations from mucous surfaces of the intestines. 4. Organic diseases of the liver, peritoneum. 5. Poison in the blood, as gout, typhoid fever. 6. Want of tone to the muscular fibres of intestines.

**Symptoms.**

*Symptoms.*—Where the air is swallowed, the fermentation causes the air to be thrown up by eructations. The gas is odourless and tasteless. Where flatulence is due to decomposition of food the gas is passed upwards and downwards, and is very fetid and accompanied by nausea and gripes. It is often expelled through the rectum, and has the smell of fæces.

**Treatment.**

*Treatment.*—Correct the secretions, improve digestion and the tone of the intestines. Attend to the cause. Purgatives, anodynes, antispasmodics by the mouth or through the rectum are useful. Rest, relaxation from severe studies, from harassing cares and anxieties of business, change of air, sea bathing, may be recommended. Regulate the diet; avoid indigestible food; give rest to the stomach; try nutrient enemata, or liquid nutritious diet at regular intervals. When solid food is taken the patient must masticate it thoroughly. Carminatives and antispasmodics temporarily give relief. When tympanitis is due to want of tone in the stomach pepsine, the digestive principle of gastric juice, may be given; strychnine in small doses is useful. When the stomach is loaded relief may be obtained by vomiting. When the digestion is feeble various vegetable bitters agree well; creosote, charcoal, mineral tonics, with strychnine are also tried with benefit. Where the nervous symptoms are prominent arsenic and phosphorus have been recommended, and even preparations of zinc are sometimes of service. Friction to the abdomen by stimulating liniments and application of mustard poultices are useful; in extreme cases puncturing the colon may be tried.

INTESTINAL COLIC.

Intestinal  
colic.

The affection is characterised by severe paroxysmal twisting pain in the belly, especially about the umbilicus. The pain is relieved by pressure, and accompanied by constipation, and often vomiting; there is no fever.

*Causes.*—All sources of irritation within the intestinal canal, as undigested food with flatulence; presence of worms; retention of morbid secretions or excretions; intestinal concretions; some poison in the blood, as lead; morbid structure and position of the intestines, as occlusion of the canal, constriction, hernia, and strangulation; reflex irritation (ovarian, uterine, or nervous); and exposure to cold; idiosyncrasy for certain articles of diet.

Causes.

*Symptoms.*—An expression of great suffering, with more or less symptoms of collapse. The attack ends abruptly.

Symptoms.

*Varieties of colic—Copper colic.*—In this variety the pain is sudden, aggravated by pressure, is seated just above the umbilicus; the bowels are regular, and there is nausea and vomiting. The face is anxious, lips livid, eyes sunken and a purple line appears around the gums. Where workers have inhaled minute particles of copper, there will be in addition some amount of dyspnœa, owing to the laryngeal and bronchial irritation.

Varieties.  
Copper colic.

*Chronic lead poisoning—Plumbism.*—Is another variety of colic. When lead is introduced into the system it gives rise sooner or later to serious consequences, very often the poison is insidious and not known until after a careful examination or by accident. The effects of the poison are best seen in persons working in lead. Among the white lead manufacturers the poisoning by carbonate of lead is very common, and in them the poison may go into the system through the skin or the lungs, in the latter case it is diffused as a fine dust into the air and then respired, it is often taken into the mouth and swallowed with the

Chronic lead  
poisoning.



saliva. Painters, plumbers, pewterers, manufacturers of glazed cards, bleachers, and glazers of pottery, equally suffer. Even the use of lead as medicine often produces poisonous effects.

Symptoms.

*Symptoms.*—The patients often suffer more or less from deranged health, present a sallow and earthy-looking countenance, their skin is harsh and dry, complain of great thirst, have loss of appetite, and have a metallic taste in their mouth. It has been observed from experience that many cases of gout and lead poisoning bear close relationship with one another, and cases of albuminuria are frequently associated with lead poisoning. As a consequence of lead poison colic and paralytic affections of the nervous system generally result. The paralytic affection has been already spoken of while treating on paralysis.

Colic is the most common result of lead poisoning, and is characterised by severe grinding, intensely twisting, and paroxysmal pain about the navel, attended with obstinate constipation, retraction of the abdomen, and severe vomiting. The pain is due to powerful contractions of the intestines to overcome some obstructions in their passage. The pain is relieved by pressure and by friction. A blue line is seen round the edges of the gums immediately adjoining the teeth. The pain is supposed to be due to sulphide of lead being precipitated by the sulphuretted hydrogen of decomposing matters; very often a similar blue line is detected at the margin of the anus and at the edges of the ulcers.

Duration.

*Duration.*—The disease is rarely fatal, it may last for a day or two, or may continue for a week. Relapses are very common.

Treatment.

*Treatment.*—In every case of colic put the patient upon his guard; extreme cleanliness is essential. In cases of copper colic purgatives are useful. For lead, dilute sulphuric acid as it converts the carbonate into an insoluble sulphate,

also various sulphur baths are useful in these cases. Iodide of potassium administered internally is of great service. The pain and discomfort may be relieved by opium and antispasmodics, and by fomentations. The bowels may be acted upon by enemata; some recommend calomel as a specific in cases of lead colic, others advocate alum.

## CONSTIPATION.

Constipation.

The fæcal matters consist of articles which are not dissolved by the secretions of the stomach and intestines, and various products derived from the surface of the intestines. During health the expulsion of fæcal matter takes place once in twenty-four hours. With some persons two or more stools may be passed every day owing to the natural habit, and they experience discomfort should the frequency fail to be observed. With others again, only one stool takes place every two or four or even eight days, with perfect state of bodily health. It is often hereditary.

Where the fæces are retained for some time beyond the usual habit there is difficulty in expelling them, and constipation is said to result. Constipation generally accompanies indigestion. In it we find irritability of the gastro-intestinal mucous membrane, and re-absorption of the excrements, also interference with the due performance of the functions of the stomach, liver, pancreas and intestinal glands, and hence the stools, when passed, are pale and clay coloured. In constipation, the interval between the motions may vary from a few days to even weeks.

*Causes.*—The most common cause is the torpid condition of the lower part of the colon and rectum, and their defective secretions. The contents, by a further process of absorption, become more solid, and thus rendered more difficult of expulsion. In lead-poisoning the constipation is due to

Causes.

the muscular coats being in a state of contraction, they thus offer resistance to the exit of fæces. Constipation is more common in delicate females than in males. Sedentary habit predisposes to it. Other causes are various mechanical obstructions such as worms, intestinal concretions; structural diseases of the walls of the intestines leading to constriction; pressure from without, as of gravid uterus, abscesses, tumours, or hernial protrusions or bands of adhesions; also habitual neglect of going to stool; over-use of astringent articles of diet; abuse of opium; excessive smoking of tobacco; and dyspepsia. Various acute and chronic functional nervous disorders, and reflex uterine and ovarian irritations.

Symptoms.

*Symptoms.*—The patient goes to stool once or twice a week, the evacuations are scanty, hard, and pale coloured. Fæces accumulate in the intestines and cause discomfort, the abdomen becomes distended. Its undue retention gives rise to numerous other morbid products, which also act as irritants and set up inflammation followed by ulceration. Very often even fæcal matters are retained in pouches in the colon, though a passage exists in the centre like a canal, which allows one daily evacuation. This irritation often leads to intestinal catarrh which is attended with the passage of mucus or pus; often the passage of hard fæces causes severe pain about the anus, with straining and the discharge of blood. The retained excrement is also liable to set up decomposition, and thus leads to discharge of gases by the anus, and also by the mouth. In some cases the scybala are retained in the cæcum and cause obstruction, perforation, and even ulceration of the bowels. In such cases these collections feel like abdominal tumours, which in position and shape resemble the cæcum; they yield to pressure, have a doughy feel, and are dull to percussion.

The effect of constipation upon the muscular coats of the

bowel is to weaken and ultimately to paralyse them. The prolonged retention of fæces leads to the absorption of excrementitious products into the blood. As a result normal secretions become vitiated and general functions of the alimentary canal disturbed. Liver becomes deranged, and sallow face and bilious conjunctivæ are produced. The urine becomes loaded with urates. The animal functions are also disturbed, and there is lassitude, debility, headache, giddiness, and dejected spirits. As a mechanical effect of pressure of the retained fæcal matter upon the hæmorrhoidal veins, the return of blood from the rectum is impeded, and hæmorrhoids and hæmorrhages from the rectum result. The distended colon, also by pressing upon the nerves and vessels of the lower extremities gives rise to numbness, cramps, and even œdema of the legs.

The violent straining at stool in constipation gives rise to hernia in the aged.

*Treatment.*—Ascertain the cause, and if practicable remove it by suitable measures. A change in the diet often succeeds in removing constipation. The food should be digestible and wholesome; a large variety of dishes should be avoided. Fresh fruits, as grapes, oranges, or pomegranates, taken early in the morning, are wholesome. Bran bread is good. It is requisite to have daily exercise in the open air. Cold baths, and a draught of cold water taken every morning are very serviceable; flannel worn next the skin of the abdomen is useful. In cases of atony of the intestinal walls give laxatives, as they excite the glands and muscular fibres of the large intestine to increased activity. Strong purgatives should not be given, as they produce a violent action at first, but are soon followed by torpor. Tonics, as iron with nux vomica, or strychnia with belladonna, or with atropia, are the medicines to be relied on. It is important to keep up a regular action of the bowels, and this is best effected by

*Treatment.*



gentle aperients as of senna or sulphur, combined with little belladonna. In children and young girls the employment of simple enemata of soap and water will prove highly beneficial. Occasionally, where hard scybala are retained in the rectum, mechanical interference of scooping them out may be tried. Friction to the abdomen sometimes affords relief. Electricity has been used with success in some cases.

### INTESTINAL CANAL.

Intestinal canal.

The subject of diseases of the intestinal canal may be treated under the following heads :—1. Duodenal dyspepsia. 2. Enteritis catarrhalis. 3. Perforating duodenal ulcers. 4. Contractions and closures. 5. Tuberculosis and tuberculous diseases of the mesenteric glands. 6. Carcinoma. 7. Perityphlitis and periproctitis. 8. Dysentery. 9. Cholera, 10. Hæmorrhages and vascular dilatations. 11. Intestinal obstructions. 12. Worms.

### DUODENUM.

Duodenum.

Duodenum literally means twelve, signifying a portion of the small intestines equal in length to the breadth of twelve fingers, it extends from the pylorus, and ends in jejunum, has no mesentery, and is partially covered by the peritoneum, and is more fixed than any other portion of the bowels. It is a receptacle for bile, pancreatic secretion, and intestinal juices; the latter are chiefly derived from the Brunner's glands. The food passing onwards from the pylorus, mixes here with these secretions.

Duodenal dyspepsia.

*Duodenal dyspepsia.*—*Causes.*—Is a functional disorder and is due generally to the abuse of alcohol. *Symptoms.*—The patient complains of pain in the duodenal region, some hours after taking food, accompanied by nausea; there is extreme depression of spirits, and slight jaundice.

*Duodenitis.*—Duodenum is subject to inflammation, chiefly after burns or scalds ; it often ends in necrosis and perforation. Duodenitis.

*Post-mortem appearances.*—The mucous membrane of the duodenum is swollen, the swelling causing obstruction of the bile duct ; presence of ulcers on its upper horizontal part. Post-mortem appearances

*Symptoms.*—Localised pain and tenderness in the duodenum, and jaundice due to the stoppage of bile in the duct. Languor, depressed spirits, and sometimes fever. Prostration often occurs. Symptoms.

*Treatment.*—The pain may be relieved by sedatives, inflammation reduced by salines and the strength supported by nutrient enemata. Treatment.

## ENTERITIS CATARRHALIS. INFLAMMATORY DIARRHŒA.

*Acute inflammation* of the bowels presents many grades of severity. The simplest or catarrhal enteritis may be produced by local irritations or those circumstances which give rise to inflammation in other parts. It is known by febrile phenomena at some period of its course, by marked constitutional disturbance, by congestion, tumefaction and dryness of the mucous membrane, and is followed by secretion of mucus, pus, or bloody stools, and by post-mortem changes in the small or large intestines. It may be the result of hyperæmia, which induces transudation of a salty fluid deficient in albumen. Subsequently and in chronic cases it leads to the production of abnormal mucus and of cells. It is a very common affection during life. Inflammation of the bowels.

*Causes.*—1. Obstruction of circulation in the liver ; 2. Diseases of the heart and lungs causing obstruction of circulation in the venæ cavæ ; 3. Disturbance of external circulation, as in severe burns ; 4. Peritonitis, especially puerperal ; 5. Where afferent veins are debilitated by Causes.

nervous influence, hence we have nervous diarrhoea; 6. The most common is local irritation, and in this way most purgatives act; 7. Epidemic; 8. As a symptom of some general disease, as typhoid fever. It may commence as a functional diarrhoea and gradually become organic. Very few substances, like Epsom salt, cause a copious flow of liquid from the intestinal vessels into the intestines endosmotically. Sometimes it may occur from local peritonitis. It is said to be common in scarlatina and specific fevers. The contents of the intestines are at first serous fluid mixed with epithelium and young cells, subsequently of cloudy mucus containing epithelium, and adherent to the intestinal walls.

Post-mortem  
appearances.

*Post-mortem appearances.*—This catarrh rarely affects the entire intestine, is most frequent in the large intestine, less so in the ileum, most rare in the duodenum and jejunum. The intestines are pale or dark, there may be redness, swelling, relaxation, or friability of the mucous membrane, and infiltration of serum in the submucous tissue. The lesion may be diffused or limited to the vicinity of solitary glands and Peyer's patches. The solitary glands and Peyer's patches are swollen, the mesenteric glands hyperæmic and enlarged.

Symptoms.

*Symptoms.*—When the catarrh affects the lower bowels it causes mild dysenteric symptoms, but this is rare. It frequently commences in the upper bowels, and then spreads to the whole length of the intestinal canal. If the disease be high up it causes uneasiness, aching, and griping in the belly, accompanied with nausea and vomiting, but when it reaches the large intestine, diarrhoea with expulsive pains and efforts are the result. Acute catarrh often begins with restlessness or uneasiness, loss of appetite, great thirst, pain about the umbilicus relieved by pressure, sometimes with vomiting and sometimes with fever, as indicated by frequent pulse, dry skin, chilliness, and headache. Besides

serous transudation, there is acceleration of the movements of the intestines, so that stools are both more fluid and more frequent. Diarrhœa is most common, and sometimes the only symptom. It varies in frequency, abundance, and virulence, as the signs of inflammation become more marked. The consistence varies from that in health to thinnest fæcal fluid, known as *diarrhœa stercoralis*; if all fæces are passed the evacuations lose their fæcal odour, and may consist chiefly of salty transudations of mucus, blood, bile, serum, of small portions of epithelial matter, young cells, and undigested food. This condition is known as *diarrhœa serosa*. The greenish character of fluid stools depends upon bile. The more watery the evacuation the paler the motions; there is little albumen, much chloride of sodium, and sometimes phosphates of magnesia and ammonia. After the diarrhœa has lasted two or three days the motions become natural, and are followed by constipation. In some cases, besides diarrhœa, there are pains in the abdomen, and also gripes, in which, if severe, the patient becomes pale and cool. The abdomen is tense and puffy, and there is presence or absence of pain or tenderness in the iliac fossa or at the umbilicus. The tongue is generally furred and dry, though sometimes red at the tip and edges. Appetite is impaired. If the catarrh be confined to the rectum there is constant desire for stool, and the motions contain only blood and mucus. There is great thirst, and the breath is offensive.

Diarrhœa  
stercoralis.

Diarrhœa  
serosa.

*Chronic inflammation* of the bowels occurs when the acute disease progresses for some time. It may be secondary to morbid states of other organs, as the stomach. It is characterised by emaciation, great debility, little or no fever, and is generally accompanied by constipation or diarrhœa, which is less abundant and less frequent. The tongue is moist and furred, or red and dry. The abdomen is distended, and much flatus in

Chronic  
inflammation.



Chronic  
diarrhœa in  
children.

the intestinal convolutions is readily seen and felt, the appetite notwithstanding is increased. The stools consist of softened fæces, the products of imperfect digestion, often mixed with mucus, serum, pus, and blood; the odour is offensive. The duration varies from weeks to months. In children where the disease is associated with aphthæ it frequently leads to persistent diarrhœa, vomiting, and cerebral complications, as convulsions and coma. Chronic intestinal catarrh in children is rare, it is always an obstinate diarrhœa and occurs generally at the end of the first year. The motions contain mucus, are more copious than natural, and give acid reaction; afterwards they become much more copious and watery. The child emaciates and dies before the second year. Catarrh often leads to ulcerations. Sometimes there are premonitory symptoms, and gripes alternate with diarrhœa or constipation. Sometimes none; and retention of fæces leads direct to ulceration. Sometimes there is no proper defæcation, and only mucus and blood passed. Very often contents pass upwards into the stomach and cause nausea and vomiting; vomits consist of food, bitter green bilious masses, and, rarely, a brownish feculent fluid. In such cases certainly there is an obstruction to progress of intestinal contents. When the ulcers heal they leave cicatrices and lead to obstruction.

Post-mortem  
appearances.

*Post-mortem appearances.*—The intestine is generally contracted, the mucous membrane is brown or grey. It may be puffed up, and particularly in the rectum forms polypoid protrusions. The peritoneal coat presents patches of discoloration. The sub-mucous and muscular coats are thickened and infiltrated; the mucous coat is condensed and hardened. The enlarged follicles project as white nodules above the surface, and are covered with tough grey or puriform mucus. Sometimes, though less often than in gastric catarrh, there is hypertrophy of the muscular coat, which may cause constriction. In some cases the inflammation has a diphthe-

ritic character, and then superficial sloughs form on the very red mucous membrane, and it looks as if sprinkled with bran; after the sloughs have been thrown off shallow erosions are left which bleed freely. In the lower part of the colon and rectum they form superficial erosions and ulcers from collections of hardened fæces on the spot. Severe forms of intestinal catarrh may lead to ulceration; the ulcers may be diffuse or follicular. Generally caused by foreign bodies or retained fæces in the cæcum, appendix, or the ascending colon. Ulcers may lead to perforation. Partial peritonitis, causing adhesions, may occur. Follicular ulcers are nearly confined to large intestine, particularly at its lower part, and cause great destruction. At first the follicles are swollen, and surrounded by a dark red vascular ring. They ulcerate from within, and the pus breaks through. There is at first a small follicular abscess with red spongy walls, and then a small ulcerated finely fringed opening occurs. Ulceration gradually destroys the whole follicle, hyperæmia of the adjacent mucous membrane gradually disappears, the mucous membrane is undermined, and the ulcers are circular or oval, with sharp edges, isolated or coalesced. In size they vary from one to one and a half line in diameter. The mucous membrane surrounding these ulcers is also swollen, vascular, infiltrated, and discolored. Ulceration soon extends to the mucous membrane, and the ulcers coalesce, and are large and irregular. Often coagulation of blood is found adherent to the bases of the ulcers. The mesenteric glands at the lower end of the ileum and descending colon are enlarged, of a pinkish colour and more soft, with atrophy of the follicles of Lieberkühn. There is fatty degeneration of their epithelium, and enlargement of the solitary glands. The contents of the intestines are greyish red, half fluid, floccular substance mixed with undigested ingesta. *Stomach*.—The mucous membrane is soft and congested.

**Diagnosis.** *Diagnosis*—May be mistaken for tuberculous ulceration of the bowels. In diarrhœa due to tubercles there is history of tuberculosis and presence of tubercles in other parts.

**Treatment.** *Treatment* of inflammatory diarrhœa is purely prophylactic. Attend to the diet, climate, and locality. Warm baths, castor oil, and aperients may be needed. Treat the general symptoms; casually leeches to the anus may be useful. If due to exposure to cold cover the abdomen with warm clothing and give pepper and mint tea. When the pain is severe, discharges frequent mixed with mucus, pus, or blood, and abdomen tense and tender, give castor oil with opium, and a low diet may be necessary. Fever is to be combated on general principles.

When the diarrhœa persists, it is necessary to resort to astringents and absorbents, as chalk, bismuth, rhatany. Revulsives as mustard, footbaths, and sinapisms to the extremities are useful. Relieve restlessness and irritability by opiates. Often mustard poultices to the abdomen relieve pain. In weak and debilitated, give tonics and stimulants. In chronic cases, attend to the diet, exercise and to hygiene. Therapeutically use tonics, astringents and absorbents. Nitrate of silver, catechu, kino, cascarilla, sulphate of copper, and even creasote are recommended. Let the patient wear a constant wet bandage over the abdomen. In follicular ulcers use enemata of nitrate of silver or of sulphate of zinc.

#### PHLEGMONOUS ENTERITIS.

**Phlegmonous enteritis.**

*Phlegmonous enteritis*.—Is a kind of enteritis, of great danger and severity. Characterised by the presence of hernia, severe pain in the abdomen, and rapidly ending in death.

**Causes.**

*Causes*.—Occurs as a consequence of some mechanical injury. Thus it is an accompaniment of strangulated hernia, intussusception, impaction of a gallstone, or of stric-

ture. In these cases there is intense inflammation of the affected part of the small intestines ; the diseased portion as a rule is dilated, and contains dark foetid fluid.

*Post-mortem appearances.*—The serous surface presents a general dusky red, or slaty or purplish black appearance. The mucous membrane and the submucous tissue are thick and soft, sometimes congested and present patches of extravasations, and are often covered with adherent lymph. Sometimes they present gangrenous patches, and are sometimes infiltrated with pus. The affected part is separated from the portion beneath it, by a distinct well-defined border of pale and healthy, but contracted and empty bowel. The part of the intestine above the diseased portion is also healthy looking, but is dilated and contains fæcal matter like the diseased portion.

Post-mortem  
appearances.

*Symptoms.*—These vary with the seat, extent, and degree of inflammation. There is inflammatory fever. The paralysis of the inflamed portion of the bowels gives rise to passive dilatation. Its contents are accumulated and prevented from passing onwards, and thus lead to constipation and vomiting. The skin is hot, the pulse frequent, the tongue is generally pretty clean at the beginning, but soon becomes thickly coated and dry. The disease is associated with pain and tenderness in the abdomen, and the patient lies with knees drawn up, as in peritonitis. Very often there is tormina at first which is due to spasmodic movements of the bowels, and it continues afterwards even though the paralysis is set up, owing to the efforts made by the healthy intestine above the seat of disease, to remove its contents. Vomiting is at first purely from the stomach, but it soon becomes stercoraceous, owing to the intestinal obstruction. At first vomiting consists of secretions of the stomach mixed with food, and in a short time bile becomes mixed with it. In some cases vomiting consists only of bile and glairy mucus. The cructa-

Symptoms



Stereo-  
raceous  
vomiting.

tions soon follow, and they become fœtid and turbid and with them brownish-looking contents of the lower part of the small intestines are brought up through the mouth. Such a condition is known as stercoraceous vomiting, and is said to be due to the contents of the distended and diseased bowels being constantly churned up and mixed with the inflammatory contents. Hiccough and tympanitis are always present in these cases. They are slight at first, but gradually increase till at last the belly becomes tense and drum-like. This drum-like condition may be due to the extreme distension of the inflamed bowels, to the distension of the healthy bowels above with the fæcal contents, and to the rupture of the diseased portion of the intestine causing escape of gas into the peritoneal cavity. The pulse is frequent at first, but in fatal cases it becomes feeble, slow, and irregular, and even imperceptible. The temperature is also high at first, but with paroxysms of pain it varies. The patient is bathed with perspiration. The expression is anxious and features pinched and shrivelled. The mind is clear to the last. In a few cases there may be partial insensibility or rambling. Generally there is complete suppression of urine.

Duration.

*Duration.*—The disease is rapidly fatal. Death takes place within twenty-four hours; is rarely protracted beyond a week.

Treatment.

*Treatment.*—Opium and other allied anodynes are very frequently given to relieve pain and prevent the movements of the bowels. Avoid the use of any opening medicines as they intensify the pain, increase the dilatation of the inflamed bowel, and also irritate the unnaturally soft and enfeebled bowels to increased violence. In these cases, besides opium, leeches may be applied to the abdomen, and mild counter-irritations may also be tried. Ice may be sucked, and vomiting allayed by bismuth. Extreme prostration may be relieved by food and stimulants. Hernia should never be operated on till inflammation has subsided.

INTESTINAL ULCERS.

Intestinal  
ulcers.

They are of most common occurrence. In many cases inflammation of the bowels is followed by superficial ulcers which often spontaneously heal. Very often by constant exposure to air or to irritants the ulcers become persistent. Such abrasions are due merely to mechanical irritations and are commonly met with in the duodenum and large intestines, also in the cæcum and its appendages where fæces is retained. Other forms are due to deposit of cancer, tubercles, albuminoid infiltrations, villous growths, polypi, and calcareous matters. When due to any of these deposits, at first the symptoms are those of irritation followed by catarrh of the mucous membrane, and subsequently of obstruction of the bowels with local pain and tenderness. After a time the ulcers are formed.

*Varieties of ulcers.*—These are divided into non-specific and specific ulcers:—*The non-specific* ulcers are the result of—1. Direct mechanical irritation of the mucous membrane of the intestines by foreign bodies; 2. Intestinal acid secretions; 3. Simple catarrhal, follicular, croupous, or diphtheritic inflammation; 4. Suppuration and necrosis of the sub-mucous tissue.

Varieties of  
ulcers.

*Characters of ulcers generally.*—The non-specific ulcers are often superficial, are somewhat irregular in form, and rounded. Their margins are congested and well defined. The surface is covered with a greyish discharge. The surrounding tissues are often thick and indurated. Where the ulcers are of long duration they invade a large tract of the mucous membrane, extending over many inches, and consist of group of ulcers, of various sizes, from two to six inches in diameter, each being distinct from its fellow by a congested or undermined band of mucous membrane. One variety of ulcer commences with a swollen and con-

Characters of  
ulcers.

Non-specific.

Varieties.

First kind.

gested patch of mucous membrane, which becomes rapidly covered with a whitish opaque exudation. At first the exudation is friable and granular, and rapidly spreads to the follicles of Lieberkühn. After a time it separates, leaving the healthy mucous membrane beneath. Very often the mucous membrane is not healthy, but is excoriated or presents a distinct ulcer, which is cup-shaped, with congested margin, and covered with a greyish slough. Such ulcers are common in the large intestines. They are common accompaniments in pneumonia, chronic phthisis, cirrhosis of the liver, Bright's disease, and in other chronic disorders.

Another  
variety.

*Another variety* of non-specific ulcers originates in patches of submucous suppuration, as occurs in pyæmia or deep-seated sloughing inflammation, as in boils. This variety of ulceration is generally found in the early stage of dysentery. In it the gland follicles of the colon are in a state of suppurative inflammation, they soon become enlarged and surrounded by congested mucous membrane, and readily suppurate, leaving circular ulcers with overlapping edges behind. In *another class* of cases of non-specific ulcers we find patches of extravasation or of congestion of the mucous membrane, which after a time are removed either bit by bit or in a mass, and their separation is followed by an ulcer with healthy mucous membrane beneath. Very often, as in large intestines, the patches of congested mucous membrane become livid and black, with ash-grey slough in the centre, which is very soft, and readily breaks down into a shreddy substance. Such ulcers have a tendency to spread.

Third class of  
cases.

Appearances  
of ulcers.  
Healthy.

*Appearances of ulcers.*—Where the ulcers are healthy the ulcerated surface is smooth and clean, or granulating, their edges are somewhat thick and congested, sometimes puckered and sloping with the surface of the ulcers. Where the ulcers are sluggish the edges are tumid, irregularly rounded, overhanging, and often flocculent; the surface is

Sluggish.

smooth and surrounded by congested and swollen mucous membrane. Their floor is irregular and covered with a gangrenous slough, and may be formed of submucous tissue, or of the muscular coat. They may be soft, thick, and opaque, or thin and transparent. They may be even destroyed, and perforations may take place.

Unhealthy ulcers are often found in groups, and have a tendency to spread. They also enlarge and coalesce with one another according to the stage of the disease. When numerous and large they leave a very little portion of healthy mucous membrane between them. In such cases the transverse muscular fibres are exposed to view, and the mucous membrane presents only a trace of red and swollen excrescences. Such cases are common in the large intestines. The ulcerated bowels are frequently very much contracted, and their muscular walls hypertrophied.

*The specific ulcers* are those due to specific affections, and are the following.

1. *Typhoid ulcers*.—Present ragged irregular edges, varying in size from a pea to a florin. They are longitudinally situated, mainly affect Peyer's patches, are abundant and large in the lower part of the ileum, and frequently involve the solitary glands of the large intestines.

2. *Dysenteric ulcers*.—Small, circular, with rounded edges. They gradually become larger and irregular, and are traversed with flat margins, their edges being often adherent to the base.

3. *Syphilitic ulcers*.—Are hard at the edges and base. Are found in the neighbourhood of the inlet and outlet of the alimentary canal. Are best seen in the rectum.

4. *Cancerous ulcers*.—Are smooth, their edges are thick, indurated, and regular, or irregular, with fungous growths along their margins and base.

5. *Tubercular ulcers*.—Are irregular in shape, transversely situated, and spread in the course of the vessels.



Their margins and floor are thickened, indurated, and irregular. Are found in the large intestines.

Symptoms.

*Symptoms.*—Are those due to diseases on which they depend, and also to the complications which follow them. They are often attended with hectic fever, some impairment of general nutrition, emaciation, and debility. There is more or less tenderness in the affected part. Other symptoms vary with the seat of the ulcer. In those seated in the *duodenum* the symptoms nearly resemble those of gastric ulcers, there is localised pain sometimes after food, and vomiting. If the ulcers are seated in the *small intestines* the symptoms are of gradually increasing emaciation, colicky pains, and constipation of the bowels. If the ulcers are present in the *large intestines* there is diarrhœa. The motions are liquid, very fœtid, and contain abnormal fluid secretions of the bowels, mixed with more or less blood, and often attended with colicky pain and straining. Where the ulcers approach the lower part of the large intestines the stools become more and more dysenteric, are scanty, and contain mucus and blood, often without any feculent matter, or with a few scybalæ covered by mucus, passed with extreme frequency and with great tenesmus. The fœtor is putrid and insufferable. Sometimes also hæmorrhage from the bowels occurs.

Duodenal  
ulcers.

Small  
intestines.

Large  
intestines.

Terminations.

*Terminations.*—Many ulcers *cicatrize and heal*. Where the ulcers are large, as in the rectum, they never heal, or if the ulcers heal they break out again and again. In those cases where the ulcers involving the whole circumference of the bowel heal, the portion of the ulcerated intestine becomes contracted, and often stricture follows. *Hæmorrhages* often occur from ulcers perforating into the vessels or from the congested surfaces, or from margins of ulcers. The ulcers often rupture and *perforation* takes place. This may be due to extreme thinness of the floor of the ulcer, which has also become weak and unnaturally

soft, and thus gives way under increased violence, leading to over-distension of the bowels, or to violent peristaltic actions. Peritonitis is a common result of such perforations. Frequently adhesive inflammation is set up between the ulcerated serous covering of the bowel and the neighboring viscera, and thus perforation is for a time averted.

*Treatment.*—Consists in keeping the parts at perfect rest, and thus promoting healing of the ulcers. Attend to the urgent symptoms. Relieve the discomfort, check diarrhœa, and improve the state of general health. Those remedies which promote cicatrization, as bismuth, nitrate of silver, preparations of iron, sulphate of copper, and even mineral acids, may be given with benefit. The bowels should be kept at rest by astringents. Opium is useful to allay irritation in primary ulcers. It often fails in chronic ulcers, in which cases, hyoscyamus, belladonna, and hydrocyanic acid may be given. Various vegetable tonics, and good, well cooked food, should be taken in small quantities and frequently and should be well masticated. Prepared meat is often very injurious. Arrowroot, milk, and eggs are serviceable.

Treatment.

# TYPHLITIS AND PERITYPHLITIS.

Typhlitis and perityphlitis.

In the right iliac fossa the cæcum and its appendix are only anteriorly and laterally covered by the peritoneum. Often inflammation attacks this particular part of the intestine. When it affects the muscular and the mucous coat of the cæcum it is termed *typhlitis*. When inflammation affects the areolar tissue connecting the cæcum to the psoas and iliacus muscles it is called *perityphlitis*. The disease is secondary and is generally propagated from the gut; at other times it is purely rheumatic. Perityphlitis occurs in typhus fever. In it the exudation becomes absorbed, and recovery results. More often exudation leads to diffuse necrosis of the connective tissue, and forms abscesses, which

may extend upwards to the kidneys and downwards to the Poupart's ligament, or may perforate the intestines, and lead to peritonitis.

Morbid  
anatomy.

*Morbid anatomy.*—Ulcers are frequently found in the cæcum or its vermiform appendage without previous typhlitis. Such ulcers occur in typhoid fever, and in phthisis.

Causes.

*Causes.*—The inflammation may be due to concretions, or any foreign body, as a pin or bristle, into the cæcum or the appendix. The perforation of intestinal ulcers into the cæcum at the part free from the peritoneal covering, often causes the fæcal matter to escape into the surrounding connective tissues, and leads to inflammation and abscess.

Symptoms.

*Symptoms.*—Pain and tenderness in the iliac region, with rigors and fever. The patient lies in his bed on the right side and the knees are drawn up. There is fulness and hardness in the cæcal region. When the abscess has formed there may be rigors. The abscess may open externally or into the rectum or may form a swelling in the groin or the abscess matter may pass down the course of psoas muscle, and point at the upper part of the thigh. Where it opens it often leaves a sinus. Should the abscess perforate into the peritoneal cavity fatal peritonitis results, when it opens into the surrounding connective tissue it gives rise to perityphlitis, which is known by redness, pain, and firm swelling in the cæcum, with superficial œdema of the skin.

Terminations.

*Terminations.*—Recovery takes place and the abscess heals. Very often it ends in death from general peritonitis.

Sequelæ.

*Sequelæ.*—Fistulæ are very common.

Diagnosis.

*Diagnosis.*—A tumour, an inflammatory morbid growth, a mere abscess of the skin, simple distension or impaction of cæcum by fæces, may simulate typhlitis or perityphlitis. In *tumours* of the skin the swelling is superficial, so is the pain and tenderness. In *abscess* of the skin there is in addition superficial redness. In these

affections there is no tenderness from the first, the bowels are not affected, there is no mucus, no pus in stools, and the peritoneum is never perforated. All these symptoms are found in typhlitis. Simple *distension or impaction* is relieved upon the free action of the bowels, and its onset is not so sudden as in typhlitis. In this disease there is no fever, no marked local inflammatory signs in the right iliaë fossa, and no peculiar sensitiveness of the part. In *inflammatory growths*, as of the right ovary, there is local peritonitis due to that cause, and the local symptoms are seated lower down in the abdomen, and not in the right groin; there is no well-marked tumour, no constipation, and there is history of disordered menstruation.

Inflam-  
matory  
growths.

*Periproctitis* is degeneration or chronic inflammation of the connective tissue round the rectum. It often leads to formation of abscesses. At first it appears as a hard painful tumour in the perineum near the coccyx, and could be readily recognised by the finger through the rectum; there is also severe pain on defecation.

Periproctitis.

*Treatment.*—The diet should be regulated. If there be any source of irritation present in the bowels remove it by aperients. The pain may be relieved by opium. Locally poultices may be applied, and if an abscess forms open it early.

Treatment.

### TUBERCULOSIS OF THE INTESTINES AND MESENTERIC GLANDS.

The bowel is the most frequent seat of tubercles. The cases of ulcers in the intestines are mostly due to these tubercles. The affection is invariably associated with phthisis and acute tuberculosis. The tubercles at first invade the solitary glands and Peyer's patches, and are most abundant in the small intestines just above the ileo-cæcal valve. In the duodenum and jejunum they are very rare. In the large intestine they are often found in the



vermiform appendix. The miliary tuberculosis is rarer, and is almost always in lungs as well. In catarrhs the tubercles swell. The increase depends upon an increase of the cellular elements. Sometimes this becomes more decided, and atrophy of the cellular elements takes place. The mesenteric glands which derive their lymph from the intestinal mucous membrane generally participate, and readily, after hyperplasia of their cellular elements undergo cheesy degeneration. The cheesy metamorphosis may condense into a chalky mass. This occurs mostly in the scrofulous, and chiefly in childhood; the adults are rarely thus affected primarily. The disease generally starts in the lungs, hence often found in phthisis. Caseous intestinal follicles are most often found in ileum. The disease extends thence to the colon, and is often found in the appendix vermiformis. Rarely found in jejunum; more rarely still in duodenum. Sometimes large tracts of intestine are regularly covered by affected follicles; more often several small spots a distance apart are seen. In the early stage the swollen follicles form slightly prominent, hard, grey nodules, of millet size, which become yellow and less hard as cheesy metamorphosis goes on. If the mucous membrane have been perforated by pus there is a crater-shaped ulcer. The union of several ulcers may cause an extensive loss of substance. They may lead to perforations. As destruction extends to the serous coat circumscribed peritonitis sets in. Outside the ulcers the serous coat is cloudy and thickened, and sometimes with a scanty fibrinous exudation causing adhesion to other parts of the intestine. Complete cure of these ulcers is rarely seen, but incomplete cicatrization is often found. Very often individual glands may attain pigeon-egg size, and a collection of them form a tumour. The caseous degeneration is sometimes in points, sometimes throughout the gland. In genuine tuberculosis small grey nodules are found in

points where there are no Peyer's glands. Thus miliary tubercles are distinguished from swelled follicles, The tubercles run together and spread, and often lead to large ulcers with thick mucous membrane intervening. When the tubercles invade the small intestines the ulcers which result from their softening are generally transverse and form bands round the circumference of the bowel. They keep on extending for a considerable length of time, and often cause death by perforation and hæmorrhage. Sometimes while one portion of the ulcer cicatrizes, the ulceration at the same time extends to other parts of the bowels. The cicatrization resulting from these ulcers often leads to stricture or obstruction of the bowels.

*Symptoms.*—It is difficult to decide whether a scrofulous Symptoms. child has mere intestinal catarrh or cheesy metamorphosis and ulceration. The case is suspicious if passages be preceded by pain, abdomen is sensitive to pressure, fever lingering, and there is diarrhœa. Sometimes diarrhœa disappears for a time, but there are soon again frequent copious fluid stools. Tuberculosis may last for years; the thinness of the motion depends upon the catarrh, which varies in intensity. Symptoms are those of ulceration of the bowels affected with tubercles. When the tubercles are limited to the *ileum* there will be pain, tenderness, and griping in the iliac fossa, and the bowels may be irregular. If the *large intestines* are diseased the symptoms will be those of dysentery. The tuberculosis of the intestines is a progressive disease, and therefore the diarrhœa is also intractable; patient rapidly loses flesh and strength, and looks too young, and in advanced cases suffers from night sweats and cold extremities; there are also symptoms of tubercles in other parts, and ulceration and perforation of the bowels with hæmorrhage. Death most often results from lung disease.

*Treatment.*—The same as of scrofulous disease or Treatment.

tuberculosis. Attention must be paid to hygienic laws. Change of air, suitable clothing, and good nourishing diet, with vegetable tonics and cod-liver oil, are useful. The urgent symptoms, as diarrhœa, intestinal ulceration, and dysentery, need careful attention, as they increase emaciation and general debility.

## Carcinoma.

## MALIGNANT GROWTHS (CARCINOMA).

These are generally primary and even isolated growths ; often commence in the mucous membrane of the large intestine, especially the sigmoid flexure and rectum, very rarely in small intestine. They commence at a certain spot, then invade the whole thickness of its walls, and even implicate the mesenteric and other glands. As the case advances the neighbouring lymphatics become affected. The growth extends into the surrounding connective tissue and infiltrates other parts. The scirrhus, medullary, and colloid, as in the stomach, have a great tendency to spread transversely and form ring-strictures. The diseased part often sinks, and is often fixed by adhesions. Above the stricture the intestine is dilated, filled with fæces and gas, the walls hypertrophied and its mucous membrane also inflamed ; below the stricture the intestine is collapsed. The stricture may be enlarged by the breaking down of the cancer. The destruction may extend to the peritoneum or to the bladder. The scirrhus causes thickening and induration of the mucous membrane which becomes irregular and nodulated ; it then gradually invades the muscular coat, which at first becomes hypertrophied, and subsequently undergoes fatty degeneration. The disease further attacks the serous coat and subserous tissue ; they also become destroyed, and ulceration and perforation are the consequence. The resulting ulcers are either smooth with elevated regular edges or are studded with fungous growths which often bleed very freely.

Adenoid  
cancer.

Another variety of cancer, known as *adenoid cancer*, is

common in the intestines, and is the chief source of stricture of the intestines due to morbid growths. The part of the intestine above the seat of the tumour is much dilated and its muscular coat hypertrophied, the portion beyond being contracted.

*Symptoms.*—The disease cannot be diagnosed. It generally affects the sigmoid flexure and rectum, and there is localized pain in the left ileum or in the rectum, which may be constant or paroxysmal, and is attended with tenderness. The belly is puffed up, and there is nausea and vomiting. There is habitual constipation, and when motions are passed the scybalæ have an abnormal shape and size at first; ultimately the patient passes only thin mucus and blood, and no scybalæ. There are also signs of cancerous cachexia, rapid wasting, and existence of a tumour, hard, irregular, and somewhat nodular, either moveable or fixed, and felt in the left side of the abdomen. In cases where the cancerous mass ulcerates and sloughs away there is diarrhœa, with offensive evacuations and stools containing blood with cancer-cells. Symptoms.

*Terminations.*—Death occurs from hæmorrhage or from peritonitis, owing to intestinal perforation, or destruction of the neighbouring organs. The course is rather tedious. Terminations

*Treatment.*—Is palliative. The diet should be liquid, nutritious, and such as to form as little fæces as possible. Broths, eggs, milk, and laxatives, so as to get a free stool every day, are required. Treatment.

### DYSENTERY—BLOODY FLUX.

It occurs in an epidemic form, has a tendency to rapid and extensive ulcerations of the rectum and colon. The word literally means difficulty or badness of the intestines. It is a specific disease, affecting the mucous membrane of large intestines, chiefly the rectum and a portion of the descending colon. It rarely involves the deeper layers or Dysentery.  
Definition.



extends beyond the ileo-cæcal valve. It is supposed to commence in solitary glands which become enlarged and prominent, and often ulcerated. In several cases the whole bowel becomes disorganized with shreds of mucus, pus and blood. Perforation is rare. The disease is chiefly characterised—1. By considerable febrile phenomena; 2. By frequent calls to stool, the evacuations mixed with mucus and blood and passed with griping and tenesmus; and, 3. By tendency to great prostration.

The disease is infectious and affects only the intestinal canal. It results chiefly from miasm. Is a most common affection in India, and occurs both as an idiopathic affection and as a complication of some other diseases, as liver, &c. It spreads epidemically in the tropics and in unhealthy localities, and is most prevalent in the months of August, September, October, and November.

Causes.

*Causes.*—It may be due to exposure to cold after being heated; to malaria after the rains; to other poisons emanating from the soil; to impure and insufficient food, raw fruits, spices and condiments, fowl fish and meat; to the use of drastic purgatives. Cachexia may often lead to it.

Pathology.

*Pathology.*—The poison is said to enter the blood and locate in the intestines. The poison often leads to the retention of fæces, which, acting as a foreign body, sets up dysentery. Some consider dysentery as a simple inflammation, others describe it as a specific inflammation which assumes an epidemic or an endemic character, a few assert it to be a diphtheritic inflammation.

Morbid anatomy.

*Morbid anatomy.*—*Three varieties.*—In mild cases the mucous membrane of large intestine is reddened, is infiltrated with greyish-white exudation which covers the epithelial coating. The submucous connective tissue is infiltrated and swollen. *First degree of severity.*—The solitary glands are swollen, and, in the rectum, sigmoid flexure or cæcum, forming round prominences on the mucous mem-

First degree.

brane, varying from a mullet seed to shots. These are pale in some parts, but at their base or summit they are turgid. The mucous membrane round the glands is usually rough and covered with a thin aphthous layer, and the particles of epithelium are mixed with fibrin. Even this stage shows that the part of the mucous membrane is affected by mortification and sloughing and not by ulceration.

Chronic diarrhœa, when not due to tubercles, is chronic dysentery of the first degree. In chronic dysentery, there is thickening of the mucous membrane, and instead of the glands being raised they are replaced by orifices, leading into round sacs in the submucous tissue. Chronic diarrhœa.

*Second degree of severity.*—In this variety the solitary glands are chiefly affected. It differs from the first stage in that in this variety the mucous membrane between the glands being the seat of active inflammation, the glands lose their vitality, and are converted into small sloughs, the mucous membrane is thickened and altered; the muscular and serous coat are also œdematous. The diseased portion of the intestine is dilated and is filled with epithelial masses, shreds of exudation, and an albuminous fluid mixed with blood. It generally contains no fæces. The mucous membrane connecting glands dies in patches. As the disease goes on, the cavities contain sloughed glands, and appear as if punched out, or the entire mucous membrane in large tracts may become gangrenous without affecting the glands. Second degree.

*Third degree of severity.*—It is often fatal in a few days, large tracts of the mucous membrane are rapidly reduced to a state of slough. The whole of the mucous membrane affected is of a dark colour and swollen. Half the length of the large intestine may be affected. In some cases, ulceration commences as a process of sloughing, the slough appears at the summit of enlarged glands and then afterwards spreads. Very often ulcers occupy Third degree.

a large area, and the glands and their intervening tissue are all destroyed simultaneously; sometimes exudation undergoes a process of disintegration involving at the same time the superficial and deep layers of the membrane. The ulcers, when formed, are small and circular with rounded edges, gradually they become larger, irregular, and traversed with flattened margins. In some cases perfect cicatrization ensues. In other cases they become chronic and remain open for months and years, and are exceedingly irritable and even contracted. Now and then all the coats of the intestines are destroyed and lead to perforation or hæmorrhage.

Favorable  
cases.

In *favorable cases* cicatrization ensues with or without puckering, the edges being rounded and adherent to the base of the ulcer. In many cases the cicatrices become thick, and indurated and contracted and stricture results.

Fatal cases.

In *fatal cases* other lesions are found:—1. Redness and roughening of the mucous membrane of the ileum. 2. Absorbent glands connected with inflamed colon, rarely show marked signs of disease. 3. Not unfrequent pneumonia. 4. Abscess of the liver; some special conditions must be present to cause it. Some regard abscess in the liver as an effect due to a similar cause, as of dysentery, others regard hepatic abscess as a consequence of portal pyæmia due to dysenteric ulceration. In China, though dysentery is common, hepatic abscess is rare. Hepatic abscess is common in India; in more than half the number of cases of dysentery they have hepatic abscess. It is rarer among Hindoos, as they do not drink alcohol nor use mutton or fish, either stale or fresh. 5. Dysentery and phthisis are not incompatible. In phthisis the intestinal ulcers generally show tuberculous matter at the base or edges. 6. In dysentery and typhoid fever the ulcers may be combined.

It will be worth while to remember different parts of the intestines attacked by different diseases. Thus, in

*dysentery* the glands of large intestines. In *typhoid fever* the glands of small intestines. In *tuberculosis* the glands throughout the canal and small intestine most often. In *carcinoma* the submucous and muscular tissue of large intestines, but rarely the small intestine. In *simple ulcers* the duodenum.

*Symptoms.*—In the *first variety* there is often but little febrile disturbance; it must therefore be sharply looked after. In the *second* there is heat of skin, thirst, loss of appetite, quick pulse, tongue red, less moist than natural, and rapid exhaustion of strength. The febrile disturbance is not greater than might be expected from the local lesion. Tenesmus is only present when the lower portions of the canal are affected. In this variety fæces are solid. If a part of the intestine higher up is affected fæces are not solid, owing to the irritated part of the colon pressing them, and the liquid therefore passes rapidly on, and the stools are mixed with blood and mucus. When the affected portion is low down there is time for the formation of solid fæces by the contraction of the healthy intestine above the affected region. As a general rule, fæces in the stools indicates the part of the large intestine affected. Another guide is the situation of pain and tenderness. Thus, examination of fæces is useful as a guide, especially where there is morbid irritability of the alimentary canal, and where, after taking food it causes an immediate evacuation. All symptoms taken together indicate the degree of severity. The quantity of bloody mucus discharged is a rough indication of the extent of mucous membrane affected. In worst cases pain is severe at first, it then fades, and at last disappears. The sudden fall of temperature is a bad symptom. *The third variety.* In this form the stools are bloody from the beginning, and later on liquid fæces sometimes containing sloughs. Symptoms of this form are—great febrile disturbance, quick and feeble pulse, dry often



brown tongue, loss of muscular power, intense headache, delirium, and sometimes subsultus tendinum. This form attacks both strong and weak subjects.

In detail.

*Symptoms in detail.*—These are—1. Febrile phenomena ; 2. Those due to excessive irritation and spasmodic contractions of the large bowel ; and, 3. Those due to constant outpourings into the bowel from the diseased mucous membrane. Thus we find at first in the milder forms simple innocent diarrhœa, with slight colicky pain, loss of appetite, clamminess of mouth, great thirst, and slight constitutional fever, and then the passages increase in frequency. The pain becomes torturing and accompanied by strangury ; there is much straining, but scanty stools and dysentery becomes established. In another class of cases the patient is suddenly attacked with fever and complains of costiveness, and takes a purge, and he probably passes a large solid stool, the scybalæ being covered with greyish mucus, and then the dysenteric symptoms follow. In some cases dysenteric symptoms are observed from the very first. The patient is compelled to sit straining at stool and with violent griping, passes a little mucus and very little feculent matter. The stools are very offensive, and there is a sense of uneasiness and burning at the anus and in the large intestines. After an evacuation relief is obtained, but in a few minutes pain again recurs, and so for 20 to 30 times in 24 hours. With this the fever continues, the tongue is coated, the griping pains in the abdomen are chiefly felt in the course of the colon, and a sense of heat and burning along the colon and rectum, there is also tenderness in the left iliac fossa, and frequent desire to stools with griping and tenesmus or a sense of bearing down, as of the presence of a foreign body about the lower end of the rectum. These sensations are often relieved after the passage of a stool ; but soon return and are then more agonizing than before.

Characters of stools.

*Characters of stools.*—There is much albumen in the

dejecta. The discharge is semifeculent ; or consists of hard scybalæ, which soon become scanty, slimy, or gelatinous ; or feculent matter mixed with blood. The stools are most offensive. Notwithstanding frequent calls to stool, the evacuations contain very little or no feculent matter, and hence we find complete constipation of fæces. When the disease is situated high up, the stools may also contain abundant depraved biliary secretions. When the disease is confined to the rectum the stools contain hard scybalæ, covered with mucus, and blood is separate. In advanced and severe cases the symptoms are intensified, the stools are muddy-looking, and after a time they become watery and copious, and contain only shreds of membrane mixed with mucus and blood ; they often look like washings of beef. In some cases the stools are pure blood or contain only sloughs of the detached mucous membrane. *Under the microscope.*—The stools present abundant epithelium cells, blood corpuscles, exudation and pus cells, and remains of the membrane.

Besides the symptoms just enumerated there are burning *pains at the anus* as if a foreign body be lodged there, also pain and tenderness in the course of large intestine. At first the abdomen is retracted on account of pain, but soon becomes distended with gases in the intestines. There is also nausea and vomiting in these cases. There is irritability of the bladder, with scalding or retention of urine.

According to the character of fever, dysentery is divided into *inflammatory* and *adynamic*. In severe or *inflammatory* cases the fever is high. The motions very frequent, abdomen sensitive to slightest pressure. The tenesmus is very severe, there is much blood and flocculi in the dejecta, there is loss of appetite, dry tongue, mental depression and slight delirium, and the case assumes an *adynamic* form. The motions finally become blackish, and also contain large shreds of mucous membrane. The extre-

Pains.

Inflammatory  
dysentery.

Adynamic  
dysentery.

mities are cool, the body is burning, the patient is often collapsed, the countenance is distorted, and motions passed involuntarily. There is bleeding from the nose and petechiæ on the body, and death takes place in a few days. Very often the abdomen becomes puffy and pain and tenesmus cease before death.

Terminations

*Terminations.*—It may end in recovery or death, or pass on to a chronic form. Death takes place by collapse or exhaustion (Asthenia), by hæmorrhage, or by perforation. In favorable cases the disease ends in from six to eight days, fever diminishes, the stools become more feculent, intervals between evacuations increase, stools lose their dysenteric character, pains cease, pulse rises, tongue moistens, the expression of countenance and strength improve. Convalescence is slow and protracted.

Chronic  
dysentery.

*Chronic dysentery.*—Like all other chronic complaints, chronic dysentery continues for a long time, with remissions and exacerbations. The disease is most troublesome. The symptoms depend on the state of the bowels, also upon the constitutional diathesis, and upon the diseased condition of some other organs. There is constant pain and tenderness, with gripes and tenesmus; the sphincter ani in some cases is completely paralysed. The stools are generally well formed and covered with mucus or blood, or they are more or less liquid mucus, serum, or blood mixed with fæces; sometimes they are pale, frothy, muco-purulent, or even purulent. The appetite notwithstanding is great, the tongue is dry, glazed, and fissured. There is no vomit. The patient becomes emaciated, has a sallow and cachectic aspect, suffers from weakness, exhaustion, and hectic fever, death taking place gradually from asthenia.

Diagnosis.

Impaction.

*Diagnosis.*—Dysentery may be mistaken for impaction of intestine with hardened fæces. The *impaction* may be in cæcum or sigmoid flexure. In it there is gastric and intestinal irritation, with vomiting and paroxysmal pain.

The bowels are constipated, there is severe straining, but only mucus passed. A well-defined tumour in one or other of the iliac fossa, and the symptoms of intestinal disturbance having been existing for some time, clear up the diagnosis. In impaction the vomiting is not constant, and there is no marked prostration. The laxatives relieve the symptoms at once.

*For typhlitis or perityphlitis.*—In typhlitis there is Typhlitis. marked degree of fever, the patient lies in a characteristic position on the right side with knees drawn up; there is great tenderness in the right iliac region, and also a tumour in the right ileum. The vomiting and constipation are not always present, and no bloody stools.

*For Mælena.*—*Intestinal hæmorrhage.*—The examina- Mælena. tion of the rectum may reveal presence of polypus, or there may be history of purpura, of typhoid fever or of some form of exanthemata.

*For local peritonitis.*—In peritonitis there is vomiting, Peritonitis. localised pain, and also abdominal tenderness, and the tumour is sensitive. The vomiting is not frequent, the constipation is not so obstinate, but the pain and tenderness is severe and the fever high.

The disease is generally complicated with hepatic abscess, though both diseases are independent of each other.

*Prognosis.*—Is unfavorable if there be an epidemic, and Prognosis. also if the attack is severe, the stools like washings of beef, and the patient asthenic; also if the case is of long duration, and associated with hepatic complications. The signs of collapse and adynamia, of gangrenous stools, of severe hæmorrhage and the sudden subsidence of griping and tenesmus, while other symptoms are becoming worse, and suppression of urine are very unfavorable signs.

*Treatment.*—1. Bleeding by leeches is useful when well- Treatment. marked tenderness of the abdomen exists. 2. Calomel and opium, till signs of inflammation are abated, or the patient



mercurialised. 3. Castor oil. 4. Purgatives are useless. 5. When calomel irritates, give hydrargyrum cum creta with Dover's powder. 6. Ipecacuanha is useful where the skin is hot and dry. 7. To relieve tenesmus give opiate enemata. 8. Warm poultices to the abdomen. 9. Stimulants in some cases. 10. Diet, only milk and farinaceous food.

- Treatment in detail.*—In the early stage, confine the patient to bed, and a dose of castor oil with or without tincture of opium, is all that is required.
- In detail.** Ipecacuanha. Ipecacuanha powder has been highly reputed in this disease, and in acute cases, 3ss doses, every three hours, cures dysentery in three or four days. It sets up vomiting and thus checks dysentery. But in order to avoid vomiting being produced by Ipecacuanha, in these cases, a large mustard plaster is to be put to the pit of the stomach, followed by a dose of morphia draught. Very often ordinary cases get well under Dover's powder alone, or combined with bismuth.
- Locally.** Locally, warm poultices, or turpentine fomentations, or mustard plasters to the abdomen, and if straining be severe, opiate suppositories, or pieces of ice introduced into the rectum, are beneficial.
- Diet.** The diet should be beef tea, sago or arrowroot, or rice congee, with plenty of milk or curd, given repeatedly and in small quantities. Stimulants should be strictly avoided.
- Astringents.** Hygienic measures need every attention. Astringents are indicated if the stools are more feculent, and contain less of mucus, shreds or blood. Laxatives and even aperients may be given if the secretions are not free, but which keep up the irritation. If the pain be intense and the inflammatory phenomena severe, calomel with or without opium, may be given. Sometimes the application of a few leeches to the tender part gives considerable relief. In malarious districts or with the history of scurvy, give large doses of quinine mixed with Dover's powder, or bael fruit for chronic cases. Regulation of the diet, rest to the
- Calomel.**
- Leeches.**

bowels, improvement of the state of general health, change of air, the constant use of warm clothings next the skin are all that is useful. Avoid solid meat, and as recovery approaches, give milk and broth. In chronic cases give astringents, as catechu and sulphate of iron. When inflammation is severe, injection of a few ounces of black wash with laudanum will be useful.

### CHOLERA ASIATICA.

*Cholera Asiatica.*—It is generally attended with looseness of the bowels, or with the flow of superabundant acrid bile. It is also known as epidemic, malignant, Asiatic, serous or algide cholera. Algide signifies coldness of the surface, which is one of the chief signs of this disease. The disease is due to some specific poison in the blood. Cholera Asiatica.

*Causes.*—Where endemic, it probably results from miasm. Causes. Is said to develop in India on diseased rice. Is contagious through dejecta. Is carried from place to place. Porosity of soil allowing the contents of cesspools to soak in, favours the production of cholera. Low situations favour its spread. All ages are susceptible to it. Errors in diet, filth, overcrowding, bad drainage and bad sewage, catching cold, laxatives, emetics, all help to diminish the resisting power.

*Anatomical appearances.*—Body remains warm a long time after death. Sometimes even at a post mortem there is increase of temperature. Putrefaction soon sets in in the congested parts. Certain muscles contract and therefore on post mortem they alter the position of the body. The rigor mortis is hard to overcome. The eyes are deep and sunk in the orbit, and surrounded by wide blue rings, eyelids are half closed; the uncovered parts of the eyeballs are dry; the nose is pointed, cheeks sunken, lips bluish, and in spots. Elsewhere there is cyanosis, which is most marked in terminal phalanges of fingers and toes. Subcutaneous connective tissues are hard and dry. Muscles are deep red. The blood is Anatomical appearances.

thick and dark. The right cavity of the heart is full; the left empty; the veins are full; and the arteries empty; the cerebral sinuses are distended with dark blood; the brain substance is dry; there is no serum in the pericardium. The heart is contracted; the surface of the pleura and pericardium are covered with an adhesive layer, and often with small ecchymosis. The lungs are dry and collapse rapidly. Small intestine is collapsed, it has a rosy hue, the large intestine is of a natural colour. In intestines there is a quantity of faintly coloured fluid, containing flocculi. The mucous membrane of small intestines is finely injected, especially near the valves. It is easily lacerable. There is ecchymosis in the mucous coat. The intestinal walls, the solitary and the Peyer's glands are swollen and œdematous. The intestinal villi are stripped of epithelium. Like the bits of skin on which boiling water has fallen, bits of detached epithelium still hang on. Large intestines and jejunum are generally natural. Gall-bladder is distended. Sometimes kidneys are clouded, the bladder contracted and generally empty.

If death occurs during the stage of reaction, blood is more fluid, and less dark. Lungs are not dry, but œdematous, pneumonic inflammation occurs, contents of intestines are coloured with bile. Sometimes there may be diphtheritic inflammation of the intestines; sometimes rupture of spleen; sometimes albuminous urine in bladder.

Pathology.

*Pathology.*—The most established conclusion at the present day is that the poison is contained in the discharges, that it infests the soil and the water of the place, that it contaminates food or drink, and through their agency it enters the human stomach, and thence into the blood; that the poisoned blood acts primarily on the nervous system and also on the vascular system. As a consequence it leads to venous congestion of the brain. It also irritates the secreting glands of the stomach and intestines, interferes

with digestion, and leads to serous effusions from their surface, thus inducing vomiting and purging. These discharges, although they are favourite modes of removing the poison, should be moderated in order to cure the disease, for if not corrected they become a source of new mischief, inasmuch as the constant drain causes inspissation of the remaining blood and thus causing a further arrest of free circulation, oxydation, and oxygenation. This serous drain, by causing shrinking of the tissues, generally leads to cramps, collapse, and even to suppression of urine. It is said that the poison is only developed when the dejections are thrown into the cesspools, and that it is from this exposed filth that the volatile emanations, capable of communicating the disease arise. That this contaminated water enters in the interstices of porous soil which contains organic matter, and soon develops the poison, and thus spreads the disease.

It is worth remembering that collapse may also be produced by agencies which directly act upon the coats of the stomach and intestines. Thus the poisons of corrosive sublimate, arsenic, and mineral acids, and even croton oil produce collapse. Again, morbid conditions, as peritonitis, perforations of intestinal ulcers, and intestinal obstructions also have the same effect. The opinion which maintains a high character is in regard to the implication of the sympathetic nervous system as the true factor in the production of collapse. Cholera is described as a catarrh which has localized itself upon the digestive tube and the great sympathetic nerve. The causes are the same as of all catarrhs, namely, improper alimentation and epidemic influences. The symptoms are also analogous, and they gradually pass from a mild to a grave form. The abundance of serous secretions also produced by respiratory passages and the skin shows that the elimination of morbid matters is accomplished by other organs than the follicular



disturbance of the sympathetic nerve alone. Any derangement of the nervous system is generally attended with changes in nutrition, circulation, and calorification, and with disorders of general innervation. The functions of the sympathetic nerve may be thus explained. It has the power of regulating the calibre of the arteries, by inducing contraction or allowing relaxation of their muscular coats. That, in cholera there is a wide spread irritation of the sympathetic nerve, so richly distributed to the coats of the vessels throughout the alimentary canal, and which has also an intimate relation with the nerve supply to the arteries of the heart and lungs. This can easily explain the cause of small pulse, cold skin, cold breath, diminution of urea, and scanty and suppressed urine. Experiments have proved that division of the branches of the sympathetic nerve supplying the intestines gives rise to a copious alkaline serous secretion into the bowels. This is owing to the vasomotor nerves of intestinal walls themselves being paralysed or exhausted, so that dilatation of their vessels occurs with profuse serous discharge.

Symptoms.

*Symptoms.*—There is a period of incubation of probably three days. The *mildest form* is simple diarrhœa, with rice-water evacuations and vomiting. Such diarrhœa is obstinate, and opium has little effect on it. *Second form* commences with rice-water stools and vomiting, is soon followed by cramps, laborious respirations, lividity, and coldness of the body, sinking of the pulse, and collapse; or the disease may set in suddenly and without any warning; or with restlessness, depression of spirits, great pallor of the face, and painless profuse diarrhœa lasting for a day or two. The purging is at first only the contents of the bowels without pain or any gripes. The evacuations soon become copious and watery, and are of the colour of rice water, and contain minute white flocculi of fæcal matter or detached portions of mucus; generally inodorous, in other

cases of a peculiar characteristic foetor. They are sometimes accompanied with and often followed by copious and even forcible vomiting of a similar fluid at first; but soon the vomited matters contain medicine, sero-mucous fluid, and bile. It is sometimes attended with exhausting retching, and even a spoonful of iced water cannot be retained. The great transudation of fluid causes thickening of blood, and there is great thirst. After a few minutes or an hour or two there follows severe pain in the abdomen, and cramps in the calves and fingers. The patient feels as if he is extremely exhausted; there is restlessness and jactitations; the abdomen is retracted and pinched up into folds, and stiff when touched. The tongue is covered with a thin fur, is pasty or dry, and often protruded between the lips. The features drawn; nose sharpened and thin; cheeks sunken; face pinched, ghastly, and livid; the eyes look hollow and shrunken; the surface of the body is cold, bedewed with dampness, and assumes generally a leaden hue; the fingers shrunken and wrinkled; the nails blue; and the hands look like claws. The pulse is extremely frequent, small at first, and soon becomes imperceptible. Urine now becomes scanty and albuminous, or even suppressed. The respirations are irregular, hurried and unequal. The breath is cold, and the voice hoarse and low. The mind, however, remains clear to the last, and the patient himself feels hopeful, but is apathetic and indifferent as to the result, and loses one fifth of his weight in a few hours. He lies on one side, is often irritable, tosses his arms in bed, is restless, throws off his bedclothes as if to relieve himself from heat of the body. At times he craves for water and gasps for breath. In a few cases the patient sleeps with eyes half closed, and the brows contracted and frowning. He is often harassed by cramps. Vomiting may now cease, but purging continues, and the stools are devoid of bile.

In severe, but rare cases, all the secretions of the body

are suppressed from the first, and the patient dies from collapse, though there may be no purging or vomiting.

Favorable cases.

In favorable cases the reaction sets in; the vomiting and thirst become less; the body becomes moderately warm; the face gets flushed; respiration and circulation return to their normal state; the restlessness subsides; the urine is voided; and the stools become dark coloured, though offensive.

Unfavorable cases.

In unfavorable cases the reaction may be only for a short time, and is followed by cerebral or pulmonary congestion, ultimately leading to death in from six to twenty-four hours.

In some cases the reaction may be very high. The intensity of fever with head symptoms may ultimately end in typhoid symptoms and death. In many cases where opium is used largely in the early stage, the reaction is sudden, there is suppression of urine, ending in death from uræmic poison or from coma. The sudden cessation of evacuations is an unfavorable sign.

Characters of stools.

*Characters of stools in cholera.*—The discoloration chiefly depends on the great watery discharge. There is abundance of water, small quantities of epithelium, here and there scattered granules, little albumen, and large quantities of salts, especially the chloride of sodium. May also contain triple phosphates and blood-corpuscles. The rice colour is due to their containing albumen. Where the stools are bloody, and the patient also collapsed, recovery scarcely takes place.

Cholera has a peculiar influence over females, and especially during gestation. Thus, during the stage of collapse we notice in them a sanguineous discharge from the vagina; and if the disease occurs during the early months of gestation abortion generally results; but if the disease occurs at a later period, the fœtus is always found to be dead in the womb. In such cases the female per-

spires very profusely, she has a copious discharge from the vagina, and there is absence of foetal heart sounds.

In this affection in the case of suckling women or of wet nurses, the milk continues to be freely secreted, although the urine and bile are generally suppressed.

*Complications.*—During the reaction various skin diseases, such as herpes, urticaria, or roseola appear, also other complications arise, as swelling of tonsils or of the parotids, catarrhal bronchitis, or pneumonia.

Complica-  
tions.

*Sequelæ.*—Croupous nephritis is a frequent sequel.

Sequelæ.

*Treatment.*—*Is preventive.*—In order to prevent further spread of the complaint attention must be paid to improve the drainage, and remove all nuisances. For this purpose use chloride of lime, permanganate of potash, or sulphate of iron as disinfectants. Keep and regulate an adequate supply of pure water, and carefully isolate cases of the sick from the healthy. Purgatives, unwholesome food, stale meat and fish, bad or unripe fruits, or putrid vegetables, should be scrupulously avoided. It is imperatively necessary during the prevalence of the disease to boil or filter all water used for drinking purposes. The diet should be plain and nutritious. As soon as diarrhœa comes on take hot pepper-mint tea, with opium, and check diarrhœa at once. Use water compresses to the abdomen, keep the patient in bed well warm, and give light nourishing diet. If there be offending matters with the intestinal discharges then only give laxatives with aromatics combined, to be followed within two hours by astringents. In order to arrest watery discharges some use opium in full doses at first, to be followed within two hours with astringents, until serous character of stools has disappeared. In well-established cases efforts must be directed towards isolating the cases as far as possible, and giving them plenty of fresh air. Fumigations of sulphur or carbolic acid powder should cover all the excretions and clothes. The bedding of the sick

Treatment.



should either be burnt or washed with disinfectants. To the patient give iced milk, iced soda, iced water, or ice to suck. The water from contaminated wells or that derived from foul drains must be rigorously avoided. Vomiting and pain may be relieved by mustard-and-linseed poultices to the abdomen and calves.

Stage of  
collapse.

*The stage of collapse.*—Some use stimulants, as brandy or champagne, with ammonia and aromatics, to bring on reaction; but alcohol in dilution, when taken in large quantities and often repeated, tends to affect nervous centres, and thus causes gastric or gastro-intestinal catarrh, and also increases the fever, which accompany the reaction. Opium is highly useful in the early stage, often one large dose suffices, but should only be given if there be no suppression of urine. In advanced cases as in collapse give champagne or rum and water; opium should never be prescribed as it is useless and also does harm; useless because very little is then absorbed, it being only returned unchanged or merely diluted with the discharges from the stomach and intestines, the absorption of the gastro-intestinal mucous membranes during the collapse being in abeyance; injurious because during reaction the remainder of opium becomes suddenly absorbed, and leads to stupor, uræmic intoxication or death. If the stomach be irritable and thirst great use ice and water freely; water also corrects the inspissated contents of blood due to rapid escape of liquor sanguinis. Very often powerful stimulants, as oil of anise, capsicum, juniper, or cinnamon, all mixed with ether and with diluted sulphuric acid are useful in the early stage. They may be given in a highly concentrated form, and in such doses as to bring out free perspiration at once. By such means we readily overcome inspissation of blood, which causes contraction of the cutaneous arteries; they have also a counter-effect on the nervous system. When the body is cool wrap it in flannel or use hot bottles to the feet. To check copious

Opium  
useless.

Injurious.

perspiration application to the surface of powdered ginger or burnt ashes, from the first may be of service. Very often large poultices of Indian meal, mixed with mustard and applied over the abdomen give great warmth to the body. During reaction give good diet, milk, and broth; if the reaction is high use diaphoretics and even diuretics, with a few drops of digitalis.

Calomel alone or combined with creasote has been very Calomel. freely used. It is said to promote the secretion of bile. It is usually given before the collapse sets in. In advanced or collapsed cases there is no medicine that will do any good, as none is ever absorbed during collapse. Experience has taught that calomel, as is generally used, is given in too large doses, and is therefore apt to aggravate the irritation of the digestive mucous membrane. That being in itself a powerful sedative, also helps towards exhaustion and collapse. If used constantly and in repeated doses it often keeps up nausea, vomiting and diarrhœa, which without it would do better. It has been premised that at one epidemic the disease may become more fatal than at another, and the remedies tried during one outbreak may prove quite valueless during another. That, as a rule, the disease is always more severe at the commencement of an outbreak, and it becomes milder towards its close. If the drugs administered by the mouth fail in this disease, owing to their value, being extremely doubtful, and also because of their not being absorbed into the system during the collapse, we may try them hypodermically. Thus injections of morphia or of hydrate of chloral, are often found to produce some good results. Hypodermic injections. Ice-bags to the spine and to the abdomen often repress congestion which accompanies intestinal flux. Cramps may be relieved by sinapisms, chloroform or turpentine embrocations, or rubbing the part with powdered ginger. For collapse our object is to restore the heat, and to produce the secretion of urine. This

is best done by frictions, stimulating liniments and application of hot bottles to the feet and hands, mustard plasters to the precordia and calves, and enemata of warm water. Some recommend a bath of warm water of  $98^{\circ}$  to  $104^{\circ}$ ; which is worth trying if the patient is strong. Stimulants, opiates, and astringents all do harm, so do also emetics and purgatives. In cases of collapse astringents are injurious, as they stop eliminations, recovery only occurring in cases where diarrhœa is only partially checked. Where the secretion of urine is free, however violent the attack may be it always ends in recovery. Concentrated essence of camphor, or the tincture of capsicum, are well spoken of for restoring animal heat. During the reaction keep the patient at rest, keep him quiet in bed, and give him broth and black tea. Undue exposure should be avoided as it re-establishes diarrhœa. If there be stupor with flushed face, showing violent cerebral congestion, try sinapisms to the neck, cold to the head, calomel and ipecacuanha internally, or apply a few leeches to the temple. If the disease be complicated with congestion of the lungs, turpentine stupes to the chest will do good. For the suppression of urine, thin paper, or leaves of digitalis, soaked in hot water, and applied to the pubes, or cupping over the loins, or frictions of belladonna and chloroform or liniments to the pubes may be tried, or, as some recommend, give benzoate or nitrate of ammonia internally.

Intestinal  
hæmor-  
rhages.

#### INTESTINAL HÆMORRHAGES AND VASCULAR DILATATIONS.

Intestinal hæmorrhage is otherwise called *melæna*. It is characterised by a discharge of dark-coloured blood alone, or of blood intimately mixed with feculent matter; may occur from some mischief in the upper part of the small intestine, most often may be due to portal congestion as in cirrhosis; often results from the intestinal ulcers. Such hæmorrhages

are common in typhoid fever, dysentery, or intestinal tuberculosis. Varicose or other diseases of the coats of the vessels; purpura and hæmorrhagic diathesis, scurvy, malarious and other infectious fevers, piles and varicose dilatations of hæmorrhoidal veins, are among its causes. The escape of blood from the hæmorrhoidal veins may be caused by—1. Collections of fæces in the rectum, tumours in the pelvis, or gravid uterus. 2. Obstruction of portal veins, as in cirrhosis, or over-filling of portal veins, as in drunkards. 3. Obstruction to free circulation of blood in the chest, or in capillaries of the lungs and in heart disease. These causes are not enough without natural weakness of the walls of veins. General plethora also leads to it.

*Anatomical appearances.*—At first the veins are bluish, and their walls thin, afterwards they become thickened. Anatomical appearances.

*Symptoms.*—When hæmorrhage comes from the upper part of small intestines it is either small in quantity, slowly discharged, and of a tarry colour, or copious, flows rapidly, and of a bright red colour. When due to ulcers it is generally in streaks, and mixed with alvine discharges. Blood from the rectum is bright, unchanged, only in streaks, and when copious it often causes death. Symptoms.

*Treatment.*—Remove the cause. Turpentine in ʒj doses every two hours is very beneficial. Enemata of ice water gives relief. Injection hypodermically of ergotine may be tried. Keep the patient at perfect rest; avoid all mental excitements; keep the bowels regular. Some recommend large doses of digitalis and acetate of lead. Treatment.

#### INTESTINAL OBSTRUCTION. (CONTRACTIONS AND CLOSURES.) Intestinal obstruction.

In these affections there is some mechanical obstruction to the passage of the contents of the bowels. They are often associated with enteritis, diaphragmatic omental or obturator hernias. Hernial strangulation is the chief cause.



*Causes.*—The obstruction may result from—1. Compression. Rectum is most often compressed by retroverted uterus or a pelvic tumour, or adhesions may drag the bowels from their normal position. 2. Owing to the structural changes in the walls of the intestine, the calibre becomes less and stricture results. Stricture from simple hypertrophy of the coat is rare. Different forms of stricture of the bowels come under this head, as those resulting from cicatrization of catarrhal, follicular, or dysenteric ulcers. Cicatrization of tuberculous ulcers rarely leads to stricture, and of typhoid ulcers, never. There is cicatricial stricture of the rectum after syphilitic ulcers or wounds. Usually also stricture from development of carcinoma does occur. Very often stricture may be due to simple spasm, as of rectum or anus, but such spasms are due to excoriations or ulcers, and may be due to adventitious growths or to separation of a portion of intestine by sloughing, as in invagination. Where ulcers have cicatrised the stricture forms a tough fibrous band. 3. Intestines may be closed by rotation on its own axis, even half a twist closes its calibre, or one bit of mesentery and intestine may be wound round another bit of intestine and its mesentery. 4. May result from internal strangulation. The intestine may get into the foramen of Winslow, or into perforations in the mesentery, meso-colon, or omentum, or fibrous bands the result of peritonitis, often cause obstruction. 5. Intestine closed by the accumulation of fæces which may even have become stony. 6. Intussusception. In this condition mesentery draws the gut to one side, elongating the opening to a narrow fissure. This is found in both large and small intestines. The lower end of the small enters the large intestine. Mostly occurs in chronic diarrhoea, and is found in children who have died of chronic hydrocephalus. The invaginated portions are generally short and not inflamed. 7. Constipation or retention of fæces

*Rotation on its own axis.*

*Internal strangulation.*

*Fæces.*

*Intussusception.*

*Constipation.*

beyond the usual period is common in many diseases. It occurs in the dyspeptics and in chlorosis.

*Morbid anatomy.*—In all cases of obstruction there is fulness, dilatation and hypertrophy of the bowel above; and contraction, emptiness, and atrophy of the bowel below. Such cases are more often seen in small than in large intestines. In cases of *compression* there is presence on the outer surface of the affected bowels of a deposit of lymph or false membrane which constricts it, sometimes the intestine is hooked down to another structure. In cases of *stricture* there is accumulation of fæces in the bowel above, and in stricture of the colon the dilatation is not in the small intestines above but in the cæcum. In such cases the strictures are generally tight. The collection of fæces above the seat of stricture often prevents healing of old ulcers, and may lead to fresh erosions in the dilated bowel and ultimately to perforation. Where the obstruction is due to *invagination* or intussusception a portion of small intestine is found descended into the large or the colon which succeeds it. A knot is thus formed consisting of three successive lengths of tube, lying concentrically one within the other. The outermost layer is formed by the colon, the innermost by the small intestine, and the middle tube by a portion of the bowel, which unites the upper end of the inner tube and the lower end of the outer. The middle tube is thus inverted, and its serous layer is in apposition with the serous layer of the inner tube, whereas its mucous coat is in apposition with the mucous covering of the outer tube. In the descent of the middle and the outer tube the mesentery is also dragged along with them. The extent of invagination varying from a few inches to several feet. The invaginated part is compressed by the outermost tube at its neck, and the canal is therefore partially or wholly obstructed, and as a result there is impediment to the passage

Morbid anatomy.

Compression.

Stricture.

Invagination.

of fæces. The compression of the mesentery and the tube leads to mechanical congestion of the vessels and subsequent œdema of its walls, to severe catarrh of the mucous membrane, to serous transudation and to small hæmorrhages in serous coats, and also to partial peritonitis. If the pressure on the vessels be not removed, absolute stasis occurs in the capillaries, and therefore mortification of the intestine results. May end in perforation and consequent death from peritonitis; sometimes artificial anus results. The mucous and muscular coats of the inner two tubes, also become black, and their serous coat of a deep slate colour; the thickening and swelling further increases the obstruction. At a later period the peritoneal coat of the invaginated portion becomes inflamed, the coagulable lymph is effused, and adhesions form between the tubes, and thus further descent is checked, adhesion making a relative cure by the inflamed invaginated part becoming detached in whole or in part by gangrene. The separation usually occurs between the twentieth and thirtieth day. Ileo-cœcal invagination is common in children. Of the jejunum and ileum is met with exclusively in adults; in them it runs a rapid course, and is rapidly fatal. Invagination in the colon and of the rectum is extremely rare. *Internal strangulation*.—In this condition a portion of the intestine is constricted by the edges of some orifice through which it protrudes, as is commonly noticed in strangulated hernia. In it there is arrest of the circulation of blood and obstruction to the passage of intestinal contents. Mesentery is the most common seat of perforation, and strangulation. It may occur in connection with the fold belonging to the vermiform appendix, with the suspensory ligament of the liver, and the broad ligament of the uterus. The small intestine is most frequently affected, the diverticula of the ileum become attached by the apex to the mesentery. In cases of torsion or twisting

Internal  
strangulation.

Twisting.

the cæcum and sigmoid flexure are most liable. As a result there is venous obstruction leading to congestion, inflammation, ending in gangrene of the affected parts. The loop of intestine so twisted is found to be enormously dilated and dark coloured, and full of fœtid matter consisting of fæces and various secretions. The mucous membrane and submucous tissue are thick and dark coloured, and the peritoneum here and there contains dark patches, and is streaked with exudations. The impaction of fæces or any foreign bodies rarely causes intestinal obstruction. In cases where strictures exist the foreign bodies are a source of great danger. They are apt to become impacted in the portion of the bowel above the stricture. Thus, impaction of biliary concretion or other foreign bodies is the most frequent cause of obstruction. As a rule the contents of the intestine, however undigestible, seldom or never cause obstruction. Hard bodies, as pins and coins, very often escape unhurt, but in a few cases they become lodged in the vermiform appendix, and may perforate the intestine, and if any stricture previously existed, such hard bodies soon accumulate in the part above, and thus increase the source of danger. Very often concrete masses and powders habitually taken accumulate and form intestinal calculi, and often lead to obstruction. Such cases are very often found in the lower portion of large intestines and in the rectum. The most frequent source of fatal impaction is the calculi from the gall-bladder obstructed into the small intestines. These calculi escape through an ulcerated opening between the duodenum and the gall bladder. From the duodenum they pass onwards, and by their shape and size and hardness set up irritation and inflammation of the mucous membrane of the intestine, and leads to spasmodic contraction of the affected muscular coat, thus leading ultimately to impaction in the small intestine just above the ileo-cæcal valve. In these

Impacted  
fæces.

Concrete  
masses.



cases the inflammation often extends to the serous coat and may lead to gangrene or perforation.

Symptoms.

*Symptoms.*—Obstruction of the small intestine as a rule is followed by vomiting; not so in the case of the large

Stricture.

intestine. Very often in cases of *stricture* the symptoms at the onset are slight. The patients feel puffed up, and have colic. The symptoms come and go. The colicky pains increase, and there is nausea and vomiting if the stricture be in the small intestine. In the case of the large intestine, and in partial obstruction, there may be pain with constipation or diarrhoea at first, and gradually motions assuming tape-like form. Where obstruction is complete there is history of long-continued constipation, followed by the more important symptom, the difficult and tedious defecation, pain coming on periodically, and attended with borborygmi. The movements of the intestines above the stricture can be seen through the abdominal walls.

Habitual  
constipation.

Patients with *habitual constipation* generally have cold feet, piles, abundant menstruation from congestion of uterine veins. Sedentary habits, over eating and drinking, all lead to habitual constipation, therefore constipation does not justify a diagnosis of stricture. Often large fæces may be passed in pure constipation, but never in stricture. Again, small fæces may occur after long starvation or after disease; the previous disease will always guide the presumption. The examination for hernia through the rectum or vagina, or by the passage of a bougie, or enemata of castor oil, will reveal the existence of a stricture if present. In obstruction at first the patient gets pale, skin cool, pulse small, and abdomen swells. There is pain followed by nausea. Vomits becoming feculent. All drastic purgatives in this stage induce vomiting by increasing the natural contraction of the intestines above the seat of stricture. Great coils of intestines may be felt in the abdomen during vomiting. The skin is covered with a clammy sweat; the pulse is imperceptible. The disease

goes on from eight to fourteen days, and death, with symptoms of general paralysis, ends the scene. If peritonitis occurs earlier the abdomen is puffed up sooner, it becomes tense and sensitive to slightest pressure. In the first case patients toss in bed, in this they lie still. The pulse is frequent, the temperature high, the respirations hurried by the pressing upwards of the diaphragm; and there is cyanosis. If these symptoms set in suddenly, and there is no vomiting, there is probably perforation; but if vomiting occurs, there is stricture. The history of liver derangements, the age and sex of the patient, the previous occurrence of biliary colic, and subsequent detection of a hard mass in the duodenum and then into the jejunum, all point to stricture. The patient after a shorter or a longer period, gradually gets emaciated and feeble, and dies of exhaustion. In the case of obstruction by *strangulation* of small intestines, the symptoms of enteritis are superadded. The fever is high, the pain is increased on pressure, vomiting becomes incessant and blood is passed by stools. In favorable cases, there is a period of crisis when the constipated bowel at once begins to act, and copious offensive feculent evacuations, mixed with mucus and blood are discharged; vomiting diminishes, fever abates, and, after a time, a piece of dark foetid gangrenous mass is voided. In ileo-cæcal invagination we find a rounded, cylindrical tumour in the abdomen, occupying the right ileum, and is shifting; occasional passage of a small quantity of fæces; owing to compression of the rectum bloody mucus is passed, and there is pain of a twisting character referred to the umbilicus. The tumour gradually increases in size, is hard and large at one time, and small and soft at another, owing to the peristaltic movements of the bowels. The invagination of the small intestine is known by the symptoms being more sudden and severe, vomiting more persistent, constipation more complete, discharge of

Strangulation.

Favorable cases.

Invagination

Twists.

Bands of adhesions.

Complete obstruction.

Gradual obstruction.

blood more profuse, inflammation more intense and death more rapid. When obstruction is due to twists or to pressure exerted from without, or to bands of adhesions, the intestine is dragged out of its normal position. Such cases are common, as seen in the obstruction of the rectum, by the pressure of a displaced or enlarged uterus, or of enlarged ovaries. Where bands of adhesions are the cause of obstruction, the intestine is either bound to the surrounding parts, or it sometimes forms short angular bends. In some cases these bands form hernial protrusions, or hook the large intestine to other structures. In these cases there is generally more or less complete obstruction, with contraction and emptiness of the bowel below, and fulness, hypertrophy and dilatation of the bowel above. In cases of twisting the affection sets in suddenly, and is fatal within a week. The symptoms are those of strangulated hernia; there is severe pain in the abdomen, which is also puffed, constipation and vomiting. Collapse rapidly sets in. There is restlessness with drowsiness. Generally the urine is scanty or suppressed. The obstruction may be due to simple stricture, very often to internal strangulation, as in strangulated hernia, in the latter case the coil of intestine is nipped by edges of some natural orifice. These orifices are foramen of Winslow, perforations in the mesentery, omentum, or peritoneum. In such cases the small intestine is more frequently the seat of obstruction. It generally occurs after thirty. The examination of the rectum will reveal if any obstruction be present. In almost all instances of complete obstruction the progress is rapid, prostration sets in early, and death may be due to acute peritonitis or gangrene. When the obstruction is gradual, and occurs in the lower part of the rectum, there will be, for a long time, constipation alternating with diarrhoea, alteration in the shape (pipe-like) and size of solid stools, paroxysmal colicky pains, and disturbance of digestion.

When the obstruction is very high up the urine is not freely secreted, as absorption is almost wholly checked. Where the obstruction is complete there is constipation, severe abdominal pain and tenderness, movements of the intestine above the seat of obstruction are very visible, and often borborygmi are heard. There is great puffiness of the abdomen, followed by nausea, vomiting, and hiccough. Sometimes perforation takes place, and peritonitis sets in. The patient gets pale, skin cool, pulse small; vomiting becomes stercoraceous. The regurgitation is said to result from the intestinal contents being gradually propelled onwards by peristaltic action, until stopped at the obstructed point. Here the canal becomes distended with the liquid mass, and then a double current is formed, one at the periphery of the tube, having the direction of peristalsis itself, and one in the centre having exactly the reversed course. In such cases death takes place from collapse in a week or ten days; when the colon is the seat of obstruction, it may only prove fatal after several weeks. As a rule, three fourths of the cases of stricture are to be found to the left of the line between the ensiform cartilage and the pubes. The rate of mortality is 43 per cent. from intussusception, 17 from stricture, 5 from gall-stones, 27 from internal strangulation, and 8 from twisting, or bands of adhesions.

*Symptoms in detail—Pain.*—In intestinal obstruction colicky pain is characteristic. It is paroxysmal and associated with borborygmi, and the coils of intestines can be seen through the abdominal walls above the seat of obstruction. *Vomiting* is a constant accompaniment of intestinal obstruction. In the beginning it is only sympathetic, but soon becomes stercoraceous. The bowels become distended partly by ingesta and partly by intestinal secretions. As a result of their overflow, of their increased peristaltic action, and of pressure from without, the contents

Symptoms  
in detail.

Pain.

Vomiting.



regurgitate into the stomach and are vomited. Being decomposed the discharge is foetid, but never feculent. In cases of obstruction nearer the stomach the vomiting is most intense, and is an earlier symptom; in obstruction of the large intestine vomiting is delayed, and not so prominent.

Constipation.

*Constipation.*—Like vomiting constipation is characteristic. When it comes on suddenly it is a symptom of internal strangulation, or of impaction of the intestine by a gallstone. Where constipation occurs gradually it indicates stricture or compression. This very often occurs in tight stricture of small intestine. Fæces pass with little difficulty owing to the bowel below containing fæces which may be removed naturally or by injections. In intussusception there is sudden constipation at first, but after a time fæces begin to pass if the large intestine be involved in the invagination. In invagination of small intestine blood is passed by stool from an early period. Tympanitic distension of the abdomen is common, and the convolutions or peristaltic movements above the seat of obstruction can be readily seen and felt. The existence of a hard lump in any part indicates the true nature of the obstruction; it may be gallstone, concrete faecal matter, foreign bodies, mass of malignant disease, or a piece of invagination.

*Urine.*—In some cases there is suppression, in others the flow is abundant. Where the symptoms are sudden and acute, and where small intestines are involved the secretion is scanty or suppressed. The obstruction in the colon or rectum is not rapidly fatal. Where impaction is nearer the stomach the progress is very rapid and fatal. In strangulation, where enteritis is associated with obstruction, death occurs within three or four days.

*Treatment.*—Where the symptoms of obstruction are associated with those of enteritis, the treatment of inflammation by leeches, fomentations, and use of opium are useful. Such treatment is always applicable in cases of

internal strangulation, impaction of foreign bodies and intussusception. Where there is no inflammation, at first a dose of a drastic or an aperient medicine, or an aperient enema may be tried; hot baths, fomentations, electricity to the abdomen may be employed. Attention must be paid to sustain the strength, and alleviate the pain. The diet should be purely nutritious, and given in small quantities. If food cannot be retained by the mouth, use nutrient enemata. The pain may be relieved by sedatives, as opium or belladonna. In order to remove the obstruction, large quantities of fluid or air may be injected into the bowels, or an opening made into the left loin forming an artificial anus. In many cases I have successfully tried the injection of large quantities of warm water by means of a stomach-pump tube. The gaseous distension may be relieved by puncturing the gut through the abdomen by means of a trocar and canula. Many recommend electricity to the belly. Some recommend crude mercury as a remedy to remove the obstruction. If the obstruction be within reach, it may be dilated by means of bougies.

### INTESTINAL WORMS.

Intestinal  
worms.

*Helminthiasis*.—Helminthology treats of animal parasites which infest the alimentary canal of human beings. There is scarcely any tissue in the body where these parasites are not known to lodge, or nourish themselves. It is divided into *nematoda* (round worms), and *cestoda* or *tæniada* includes cyst worms and tapeworms. The *nematoda* are further subdivided into *Ascaris lumbricoides*, or common round worm; *Oxyurus vermicularis*, common thread worm; *Trichocephalus dispar*, or long thread (whip) worm; and *Trichinosis*.

*Common round worms* (otherwise known as *Ascaris lumbricoides*).—Each worm in shape resembles an earth-

Common  
round worms.

Infest small  
intestines.

worm. It is elongated, cylindrical, and tapering at either end. Is from four to twenty inches in length, and two or three lines in thickness. It is firm, elastic, greyish-red, or yellowish-white, transparent when recently voided, so that viscera could be seen through its parietes. The alimentary canal is of a brown colour and terminates in the anus, which lies just in front of the posterior extremity. The two sexes are in different animals, and placed posteriorly, the sexual opening being at the end of the anterior third; the male organ has a tail shortly curved; that of the female being straighter and thicker, and has a vulva seated at a constricted point of the body, and about one third the distance from the head to the tail. They infest *small intestines*, but often migrate into various other parts. In number, one or more may be found.

In man they are chiefly found in the small intestine, they often migrate, and have been known to travel into the nose, larynx, liver, and the pancreatic ducts. They also penetrate the intestinal walls, and often reach the peritoneum, and in a few cases may be seen to lodge into some sinus or an abscess.

Symptoms.

*Symptoms.*—Often little is known of their existence until some have passed. In children they give rise to symptoms of irritation, attended with fever and cerebral symptoms. Very often, when the number is very large, they give rise to obstruction in the bowels.

*Treatment* consists in expelling them. This can be done by giving calomel, turpentine, santonine, mucuna prurens (cowage), petroleum, or powdered tin, and to be followed within four hours by an aperient. Of all aperients castor oil is the best remedy.

Thread-  
worms.

*Common thread worms* or *seat worms* (*Oxyurus vermicularis*).—They are fusiform, small, delicate worms, from two to five lines in length, whitish in colour, their surface presents transverse striæ, and each looks like a piece of

cotton thread. Sexes in separate individuals. Male organ is rolled up. The female organ is larger, straight, and the vulva is at the junction of the middle with the anterior third. Body is the same in both sexes, obtuse, and surrounded by a membrane through which may be seen the œsophagus, terminating in a globular stomach. Intestine occupies the whole length of the body, and is spirally arranged as it reaches the tail. They infest children more than adults. They are situated in the rectum and colon, and often migrate into the anus, or in its surrounding hairs, or in the vulva, vagina, or urethra. Hundreds may be found in one subject.

Infest  
rectum and  
colon.

*Symptoms.*—There is troublesome itching about the anus, and chiefly at nights, also itching of the prepuce or vulva, or, in children, of the nose. They could best be known by their discharge in fæces.

Symptoms.

*Treatment.*—Such cases are best relieved by injection of solution of salt or perchloride of iron or of bitter vegetables. Where the ova produce severe itching of the vulva, itching may be allayed by parasitocides, such as mercurial ointments.

Treatment.

*Tricocephalus dispar.* (*long thread worm* or *whip worm*). —Is one to two inches in length, and consists of a thick cylindrical body. It is thicker posteriorly than anteriorly, is hair-like, and ends in a terminal mouth. Sexes in different individuals. Male organ is smaller, one inch in length; the female organ is thicker and larger, and is about two inches. *Seat.*—Mostly in the cæcum, rarely attacks the colon, seldom found in the ileum, generally exists in very small numbers, and sometimes only a single one is found.

Whip worm.

Infest  
cæcum.

*Symptoms.*—These are due to mechanical irritation, to constitutional disorder, and to reflex disturbance. The *local irritation* may lead to congestion, inflammation, erosions, and even slight ulceration of the mucous membrane of the

Symptoms.  
Local  
irritation.



Constitutional  
symptoms.

intestines. When they migrate they set up additional symptoms of irritation of those organs. The *constitutional symptoms* are well marked among the weak and debilitated, and in young children. These are :—Disturbed health. The stomach is deranged. Patient complains of griping or biting pain, or an uneasy sensation in the abdomen, chiefly confined to the umbilicus, often attended with great thirst, pricking of the nose, vomiting, and even fainting. The tongue is furred; there are eructations, variable appetite, offensive breath, nausea and a peculiar hazy condition of the cornea; also irregularity of bowels, sometimes slight diarrhœa, the stools look greenish, and contain mucus; there is also flatulence and distension of the abdomen. The *reflex phenomena* are, scratching at the anus, picking at the nose, grinding of the teeth, dull, frontal headache, squinting, dilated pupils, twitching of the limbs with violent convulsions, and even a feeling of constriction in the throat. Added to these there are langour and depression of spirits and accelerated and irregular pulse.

Reflex  
phenomena.

Treatment.

*Treatment.*—These are often got rid of by injection into the rectum of water alone, or water mixed with common salt or some bitter infusion.

Sclerostoma  
duodenale.

*Sclerostoma duodenale.*—Is a small cylindrical worm. The female is slightly longer than the male. Rarely seen in India, although common in hot climates and in Egypt.

Trichina  
spiralis.

*Trichina spiralis.*—Are met with in the muscular tissue as minute worms. Their anterior end is pointed, the posterior thick and rounded. Generally found enclosed in cysts. They are mostly found in striped muscular fibres, and also infest the larynx. They often live for years, and in many cases undergo calcareous degeneration. They are also found in the flesh of pigs, and from the use of pork they affect human beings. The cysts containing them

become dissolved by the gastric juice in the human stomach, and the parasites are then set free. They there undergo development, and the living embryo then migrate from the intestinal canal through the walls into the small vessels and lymphatics of the bowels, and are thence conveyed by blood to other parts. Their progress is very rapid. Generally the next day after the pork is eaten and taken into the stomach, these worms become mature, and in a week or two are found to infest other parts.

*Symptoms.*—Are peculiar, and refer to mechanical irritation of the stomach and bowels, to muscular inflammation, and to constitutional fever. In a day or two after the admission of a worm into the stomach, it gives rise to great thirst, nausea, vomiting, colicky pains, and irregularity of bowels. The tongue is coated, the skin dry, and the pulse is very frequent. After a time there is pain, stiffness, and swelling of voluntary muscles, the pain increasing on moving them, and there is also high febrile phenomena. The pain and difficulty of moving the muscles is great if the muscles of deglutition and respiration are affected; the swelling of muscles often leads to stiffness and immobility of limbs. In this disease dropsy is very common; it commences first in the face, and then extends to the limbs. Hoarseness of voice and dyspnoea are also very common. The temperature often rises to 104° or 106°. The duration is variable. Recovery takes place within three or four weeks, or may be longer. Death results from inflammation of the bowel, of peritoneum, or of the lungs, or from gradual debility.

*Diagnosis.*—May be mistaken for acute rheumatism, for enteric fever, and acute tuberculosis. The absence of pain in joints, and the pain only confined to the muscles, exclude rheumatism. There is no rash of enteric fever, and no history of tubercles elsewhere.

*Treatment.*—Consists of attention to fever generally, to

urgent symptoms, and to inflammatory complications. Avoid the use of pork, especially that which is not well and completely cooked. Smoked ham and sausages are very dangerous.

Tapeworm.

*Cestoda* or *Tæniada* includes tapeworms and cyst worms. These are *Tænia solium*, *Tænia mediocanellata*, *Bothriocephalus latus*, and *Tænia echinococcus* (hydatid).

One phase of existence.

All the *Tæniadae* consist of two varieties. In one there is a characteristic *head* or *scolex*, connected with a cyst or bladder-like body. They are devoid of sexual organs, and lie imbedded in the solid tissues of the body. In the other variety the worm or *strobilus* occupies the human alimentary canal. It presents at its upper end a head, by which it adheres to the mucous membrane of the intestine. Its body is tape-like, and divided into quadrilateral segments, each segment containing a male and a female sexual organ. Each segment consists of a number of fertile eggs, and has a peculiar six-hooked embryo in it. At first these ova find their way into the alimentary canal of lower animals, where the six-hooked embryo bursts, and they altogether migrate into the intestinal canal till they reach a suitable nidus. Each segment containing abundant ripe ova, is now discharged through the anus, and is then swallowed by different animals along with their food. In their alimentary canal these ovaries rupture, the embryo escapes, attaches itself to the mucous membrane, or works its way onwards into the tissues, where it finds a suitable place for its lodgment. In the tissues it now presents a head, a neck, and a bladder-like appendage. In this larval form it is called a tailed bladder worm or *cysticercus*. In the intestine of pigs the bladder-like appendage falls off, and a succession of segments forms; thus, in the case of those eating pork we find *Tænia solium*, eating beef *Tænia mediocanellata*, and eating fish *Bothriocephalus latus*.

Another variety.

Tapeworms are most frequent in persons who indulge in

pig's flesh. They are common in butchers, and cooks who are in the habit of eating raw beef.

*Tænia solium* is of a white colour, and flat in form. In length it varies from five to twenty feet. Shape is uneven, being thick and broader behind. It is three or four lines at its widest part, and tapering and thread like at its anterior end. Body distinctly jointed, and composed of numerous, small, but broader than they are long segments. The largest segment being half an inch long, and quarter of an inch wide. Each joint has a male and a female organ opening by an aperture externally. Head is blunt, square, bulbous, and has a snout, surrounded by a double row of hooks, and further back by four round unsymmetrically arranged suckers. Neck is about half an inch long. The young links have a slight median canal, with lateral offshoots, the first indication of genitals. The older links have a prominence at the edge from which the sickle-shaped penis projects, and into which the tortuous seminferous tubes and oviducts empty. The interior of the older links is occupied by a uterus, branching out to both sides or by the ovary. In the oldest links the ovary is filled with eggs, and the small embryos with their hooks may be recognised. Vessels start from a vascular ring within the head, and run down the side of the links, and possibly communicate by transverse canals. It infests the small intestine, and is fixed to the mucous membrane by hooklets. It is generally solitary, and remains for a long time before it is fully developed. A cystic representative of *Tænia solium* is *Cysticercus cellulosæ*. This variety is most abundant in pigs, and is the chief source of measley pork, and such pork if eaten generally leads to the development of *Tænia solium* in man.

*Tænia solium.*

Infest small intestines.

*Tænia mediocanellata* attains a very great length. The head is three times as thick as the body. It has no central papillæ nor any hooklets. The links broader and thicker,

*Tænia mediocanellata.*



and sexual organs more fully developed. The head is furnished with four large round suckers, has no snout and no row of hooks. Its ova are oval. Its representative, the cysticercus affects the ox, and hence the use of imperfectly cooked beef introduces them into the intestines of man.

Bothrio-  
cephalus  
latus.

*Bothriocephalus latus, or Tænia lata, or broad tapeworm.*

—Its length is very considerable; the head is obtuse, small, elongated, and without hooks. It has only two lateral slit-shaped fossæ, one on each side. There is a single minute sexual opening on the posterior surface and in the middle of the links. Is long, flat, and thin, and about six to ten lines in breadth, of a dirty white colour, and less opaque than the preceding. These are only met with in Europe, and chiefly in Belgium and other parts. Their representative, cysticercus, is said to infest the fish.

Symptoms.

*Symptoms* of the existence of these worms are due to their mechanical influence, to their accumulation, and to their effects of a purely sympathetic action. Mechanical effects give rise to perforation, and to hæmorrhage from the intestines. Inflammation, abscesses of the intestines often result from their accumulation. They also migrate into bile duct, liver or air-passages. The migration into air-passages is known by a sudden dyspnœa, threatened suffocation, dry spasmodic cough, and pain in the larynx or trachea. Even worms in the œsophagus by pressing on the trachea or larynx often lead to these symptoms.

Sympathetic  
symptoms.

*Sympathetic symptoms.*—Refer to the nervous systems, as headache, grinding of the teeth and partial or general convulsions.

Diagnosis.

*Diagnosis.*—The attenuated state of the abdomen often observed in India facilitates the diagnosis of worms. They may actually be felt through the walls of the abdomen, and even where this is not possible, the wasted condition of the child, the picking of the nose, the great

thirst, and the hazy condition of the eyes makes the diagnosis almost a matter of certainty.

*Prognosis.*—Favorable if under systematic management, the worms can be expelled. In all cases of tapeworms it is always safe to see that the head is discharged, otherwise further growth will probably take place. Prognosis.

*Treatment.*—Consists in expelling them by an aperient preceded by those medicines which are known as specifics for removing them. The diet should be bland, but nutritious. In some cases an aperient is given first, followed by anthelmintics. Treatment.

*Tænia echinococcus.*—These affect the dog and wolf, and are found adherent to the mucous membrane of small intestine. In their perfect form they consist of four joints, each about a line in length. The head is formed of one joint, is about one-eighth of a line in width, and consists of four suckers surrounded by a double row of hooklets. The sexual organs are found in the last segment. The representative or larval form of this worm is known as hydatid. This cysticercus is capable of increase and multiplication. Their most common seat is the liver, rarely found in the brain, lungs, and kidneys. In their early state they consist of a round cyst, containing granular matter; after development the cyst walls become stronger, and their contents become fluid. The walls consist of an outer laminated portion, which is thick, transparent, and elastic, and an inner layer formed of delicate cells. The contents are colourless, the fluid containing salt, but no albumen. Full description of the hydatids is given in the description of hydatids of the liver. Tænia echinococcus.

*Filaria medienensis (Dracunculus), or Guinea worm.*—Lives in the subcutaneous tissue. Is common in India and Bombay. Is a female worm, enters the skin of man, and there becomes developed. Is cord-like in shape, varying in length from six inches to six feet, and Filaria medienensis.

about two lines in width. One or more, and even several may exist in the same person. Their common seat is the lower limbs, but they can migrate even to the upper or any part of the body. The Indians who are always in the habit of going barefooted in ponds or damp or muddy places are most exposed to it. They have a period of incubation for months before they are developed to a perceptible size.

## Symptoms.

*Symptoms.*—The affection commences as a vesicle, which on bursting, the worm comes out. There is always considerable itching and irritation in the part, and it often leads to ulceration from scratching.

Observations show that minute worms are found lodged in the confervæ in different tanks, and that persons bathing in such tanks get these worms. Under microscope the worm in the confervæ was found identical in form, colour, and general appearance to that extracted from the human body.

Characters of  
guinea worm.

*Characters of guinea worm.*—Is vermicular, and narrowed towards the head, which is subpointed. Posteriorly it is also narrow at the point of junction between its middle and posterior third, from that part it is then gradually tapering to a very narrow extremity like a whip. The body is colorless, white, filled with granules, which are absent near the head, tail, and sides, where it is clear and transparent, it often presenting a segmented appearance.

The worms, as found in Bombay, are generally two feet four inches in length, and five to eight lines in breadth. They bear in the centre of the anterior extremity a minute puncture and around it minute rugæ, external to which are two papillæ, one on each side opposite each other. The posterior end is suddenly inflected and is hard and rigid.

That these worms occur in persons who are bathing or walking in filthy water, and not in those drinking it, is shown by the fact that the worms prevail only in those

places where tank worms abound, and that they occur in the lower extremities. That gastric juice is fatal to their existence in the human stomach is shown by the fact of the worms given to pups, and then their stomach examined within a few hours, the worms were found dead in the mucous membrane of the stomach and duodenum.

*Treatment (preventive).*—Persons should not be allowed to bathe in such tanks. The tank should be dried up and cleaned thoroughly, and even lime be thrown into it. Treatment.

## DISEASES OF THE RECTUM.

Diseases of the rectum.

*Diseases of the rectum* often give rise to severe bodily suffering; at times they are the cause of barrenness in women. They often lead to great mental depression. The diseases are mostly seated within two inches of the anus, and hence, if properly detected, they would readily yield to well devised treatment.

*Proctitis.*—Inflammation of the rectum may be due to direct violence, or the presence of some foreign body, and is often provoked by drastic purgatives and abuse of strong spirits; the disease occurs less often through contiguity, although diseases of the uterus, vagina, and ovaries, and even of the male organs are very common with it. *Symptoms.*—The patients complain of intense heat round the anus, with spasm and over-sensitiveness of the sphincter ani; the stools are dark-coloured, of gelatinous mucus, and passed with tenesmus. There is fever and great irritability of the bladder. *Treatment.*—Rest, milk diet, sedatives, and hot hip-baths, are required. The fever and dysenteric symptoms must be met by appropriate general treatment. Proctitis.

*Fissure of the anus.*—The ulcer may be superficial and seated immediately within the anus. It often causes constipation, the patient deferring the act of defæcation from fear of pain and suffering. The stools irritate the sore,



and produce spasm of the anus, and severe burning pain. In such cases the bowels should be kept regular, the part should be kept clean and at rest, and by a longitudinal incision through the centre of the superficial fibres of the sphincter ani, the ulcer may be incised. To this must be added the improvement of the general health.

Chronic  
ulceration  
of the  
rectum.

*Chronic ulceration of the rectum* occurs and is attended with thickening of its coats. It is an idiopathic disease and may be due to syphilis, to the deposit of tubercles, or to general debility. In these cases the part should be kept clean and at rest, and attention to the removal of the cause, and to the improvement of the general health, is all that is needed.

Stricture.

*Stricture of the rectum* may be due to *functional* causes, as pressure of growths from without or of tumours within. To *organic*, as ulcers, cancer, chronic inflammation of the mucous membrane or of the submucous connective tissue. May result from syphilis. *Symptoms*.—In the majority of cases the whole of the diseased gut is thick, contracted, and indurated. Above the stricture the bowel is somewhat dilated and hypertrophied. The stricture is generally seated within two inches of the anus, but now and then may be found at the junction of the sigmoid flexure with the colon. It is usually a chronic affection. The patient complains of constipation of bowels, and if stools are passed they contain only mucus or blood, and passed with griping and straining. There is mental depression and great flatulence. *Treatment*.—In some cases persistent dilatation by means of bougies is sufficient. If the stricture be callous, four or five incisions should be made in different parts of the ring, and the opening kept patent by means of a plug of a roll of lint. The pain may be relieved by anodynes locally applied.

Prolapse.

*Prolapse of the rectum* is characterised by simple protrusion of a piece of the mucous membrane of the anus, or

a protrusion of all its coats to the extent of five or six inches. *Causes.*—Strumous diathesis is a cause, and the affection is very common among badly-nourished children. In them want of tone in the sphincter ani; constipation; straining at stool; long-continued diarrhœa; worms; and diseases of the urinary organs give rise to prolapse. *Symptoms.*—At first protrusion occurs only when the bowels act, but after a time it descends on the slightest exertion. In long-standing cases the mucous membrane gets indurated and becomes like skin. Very often ulcers form on its surface. *Treatment.*—Reduce the protrusion and prevent its return. The general health must be attended to. Care must be taken that the bowels act regularly. Very often surgical aid may be sought for.

*Polypus of the rectum* is most common in children. It Polypus. may be soft or firm. *Symptoms.*—The patient has frequent desire to go to stool, but passes only mucus and blood. When the polypus is villous the bleeding is profuse. The villous growth looks like a cauliflower excrescence with a narrow pedicle. *Treatment.*—Ligature is the only complete remedy. The health may be improved by cod-liver oil.

## HÆMORRHOIDS.

Hæmor-  
rhoids.

*Hæmorrhoids* signify flowing with blood. They consist of livid and painful tubercles around the margin of or within the anus, from which blood or mucus is occasionally discharged.

*Varieties.*—When beneath the mucous membrane they Varieties. are called *internal*. When outside the mucous membrane they are called *external*. *External* may be cutaneous, or dry and bleeding, or sanguineous. There are generally three, one on each side, and one in front.

*Causes.*—Hereditary predisposition. Is rare before pu- Causes.

berty. Common with females at the time of cessation of menses. Plethora with sedentary habits; warm and damp climate promotes its development. Long standing, sitting upon stone, excesses in venery, self-abuse, stimulants, over-purgations, constipation, or even stone in the bladder, all predispose to it.

Symptoms.

*Symptoms.*—No inconvenience is caused till they become much inflamed and painful by a costive motion or an excess of urine. Bleeding occurs in quantity. Sometimes they bleed regularly, and if so they must not be interfered with. There is a feeling of weight and fulness in the rectum, soreness about the anus, and aching pain during defæcation. The pain may extend down the feet and up to the loins. Swelling of one or more pea-like bodies within or around the anus may be noticed. Those within the anus become prolapsed during defæcation, and often require to be put back by the hands. In rare cases the prolapsed portion sloughs away. External ones are broad, globe like, situated at the margin of the anus, bluish in colour, and covered by a thin pellicle of integument; are elastic and tender to the touch, consist of distended skin and connective tissue, and contain within them extravasated blood and lymph deposit. Bleeding from the internal ones is very common, sometimes as much as several pounds of blood within a few hours may be passed. Some hæmorrhoids are solid, somewhat rounded, attached by a stem, and composed of thickened veins, connective tissue, and mucous membrane. Others are broad at the base, bright red and spongy, villous on the surface, and bleed much; and consist of loose connective tissue, enlarged capillaries, and small arteries and veins. Moderate bleeding from these hæmorrhoids often gives relief; when habitual, and if arrested, it gives rise to congestion of internal organs, and even, in some cases, to apoplexy.

Bleeding.

Diagnosis.

*Diagnosis.*—Hæmorrhoids may be mistaken for polypi

of the rectum, for prolapsus ani, or for venereal excrescences. *Polypi* are of slow growth, not accompanied by inflammation, nor by hæmorrhage, and are smooth on their surface. *Prolapse* is only a protrusion of an everted mucous membrane without any other change in the structure of the part or of the vessels. In *venereal excrescences* we find that there is history and other marks of syphilis, and the tumours are hard, more abrupt, and elevated. When hæmorrhage occurs, it may be from piles or from the bowels. When from the bowels, and as a result of typhoid fever, the bleeding is quite painless, the blood is of a dark colour, clotted, and mixed with fæcal matter, and there is no history of piles.

Polypi.

Prolapse.

Venereal excrescences.

Mælena.

*Treatment.*—*General.*—Find out the cause and try to remove it. Bowels must be regulated, and any excess avoided. The diet must be nutritious and unirritating. *Local.*—The part should be kept constantly soothed by some ointment of lard or spermaceti. When laxatives are necessary, use only such preparations as senna, sulphur, rhubarb, &c. Magnesia and even salines irritate the piles. When the piles are inflamed leeches applied locally, or cupping over the sacrum may be required. Internal piles, when prolapsed, must be replaced. Astringent ointments, if used continuously with care, cure piles even when old and obstinate. As a last resource removal by operation may be required. External piles need be excised freely or carefully touched with nitric acid. Internal ones ought not to be excised, but only ligatured, for excision is generally fatal from hæmorrhage.

Treatment.

## ACUTE PERITONITIS.

Acute peritonitis.

*Acute peritonitis* is an inflammation of the peritoneum. The peritoneum is a serous membrane lining the abdominal and pelvic cavities and investing the viscera. The in-



## History.

flammation may be acute or chronic. In it, as in inflammation of any other serous membrane, there is capillary congestion, followed by lymph exudation, and in chronic cases by effusion of fluid. The disease, though local, has a tendency to spread till it involves the whole membrane. In cases of recovery, the fluid becomes absorbed, the lymph organises and forms false membrane, or bands of adhesions, or thickening of the peritoneal surface. In unfavorable cases, the fluid becomes purulent, and abscess forms, which bursts externally, or perforates the intestines. Peritonitis is generally accompanied by pain and swelling of the abdomen.

## Idiopathic peritonitis.

*Idiopathic peritonitis* is more common among the poor and those enfeebled by bad health and bad living. It is also common in those who suffer from obstructive diseases of the heart, lungs, and liver, and also from chronic Bright's disease. May be induced by exposure to wet and cold, by propagation of inflammation from neighbouring parts, by internal conditions to which inflammations of other organs are commonly traceable. When occurring during the puerperal state it is known as puerperal peritonitis. *Traumatic* may be due to some external injury to the abdomen, to hernia, or to perforation of the bowels.

## Traumatic.

Peritonitis is often associated with tubercles in the abdomen or cancer (carcinoma), or may be a common result of pyæmia, rarely of metastasis, or of rheumatism.

## Morbid appearances.

*Morbid appearances.*—In acute diffuse peritonitis the membrane is highly vascular, with a number of scarlet patches. At first it is dull-looking and dry, and velvety from proliferation of tissue elements. The subserous tissue is thick and infiltrated. There is effusion of lymph, part of which coagulates on the surface, forming a false membrane, the rest, and a more liquid portion, accumulating in the cavity. The membrane varies in thickness from a line or two to four or six lines. May be quite pulpy, or

may form elastic, tough, adhesive bands. It gravitates towards the most dependent part, and thus the coils of the intestines are matted together on account of exudation of lymph. All the coats of the intestines have collateral œdema. The exudation may compress both lungs. If the patient does not die at the height of inflammation the appearances change. The fluid part of the exudation is absorbed, and later on the solid parts, which after undergoing fatty metamorphosis, disappear. Partial thickenings and adhesions remain behind, or the exudation and hyperæmia may be limited to spots of peritoneum.

In chronic peritonitis one set of cases begins acutely and leads to ulcers. In those connected with tuberculosis, the peritoneum appears opaque and thickened, and there is a large quantity of effused serum, which is also opaque and contains exudation corpuscles, or of fibrin, which may lead to ascites, or the space containing fluid may become traversed by bands of coagulable lymph. *The effused fluid* may be large in quantity and clear, or may be turbid and purulent with flakes of lymph floating in it. In one set of cases inflammation begins abruptly and leads to ulcerations and perforations into the small or large intestine. The inflammation may be of a local origin or may involve the whole of peritoneal surface. The peritoneal coverings of hollow viscera escape more frequently from the effects of inflammation than the portions of the peritoneum covering the liver and spleen. The great omentum frequently limits its spread. In conducting a post-mortem examination great care is necessary, as the morbid products are highly virulent and infectious, and if introduced into the system are highly dangerous.

Chronic  
peritonitis.

*Symptoms.*—Traumatic peritonitis begins with severe pain at the seat of injury, which rapidly spreads over the abdomen. The same occurs in perforation. In acute diffuse peritonitis the beginning is less marked. The disease sets

Symptoms.

in with severe rigors and great constitutional disturbance, and is soon followed by localised pain in the inflamed part. The symptoms vary with the intensity, the extent of inflammation, the constitution of the patient, and with the cause. The symptoms may be insidious, and there may be for a few days only febrile symptoms or even rigors. Sometimes there may be sudden vomiting and purging, or severe dysuria, or in females menorrhagia. Sooner or later the patient complains of marked fever and pain. The pain is at first confined to the parts affected, but soon extends over the whole of the abdomen. Is very severe and agonising, causes much depression, and is increased by pressure or by any movement of the abdomen; cough is very painful. The patient tries to keep the body perfectly still, and instinctively relieves the abdominal muscles by lying on the back, with the head and shoulders raised and the knees drawn up, or moves with his body bent in a stooping posture. The face presents an expression of suffering, the features are anxious looking, and drawn and pinched, the abdomen becomes tense, hot, and tympanitic. This is mostly caused by distension of intestines. Tension is increased, and there is dyspnoea from compression of lower lobe of the lung. Abdominal respiratory movements are altogether suppressed on account of the pain attending them, or from paralysis of the diaphragm. The skin is burning hot and dry at first, but soon becomes cold and clammy. The temperature rises gradually to  $100^{\circ}$  or  $101^{\circ}$ , and may reach to  $104^{\circ}$  or  $105^{\circ}$ . Respirations are hurried. If inflammation extends to the bladder, there is constant desire to urinate, and the urine is scanty, and high coloured. Sometimes it is retained in the bladder, or there may be dysuria. The pulse is rapid, hard, and wiry. There is extreme tension of the abdomen and derangement of the alimentary canal; the tongue is red, slightly furred, and dry; complete loss of appetite; great

thirst, nausea, vomiting, and absolute constipation. Often vomiting is at first mucus and colourless, then becomes greenish. In puerperal peritonitis there is only watery diarrhœa. The mind is clear. The pain is worse at first, but subsequently becomes diminished. The liver and apex of the heart are pressed up to the third rib. At first the percussion note over the abdomen is tympanitic; but later on, when effusion is plenty, the note is dull, but not absolutely so. There is great anxiety; the patient may become cyanotic. Apathy and death at the end of first week end the scene.

*Terminations.*—In favorable cases, if the cause be removed, the severe symptoms gradually subside, pain and fever abate, vomiting ceases, respirations become natural, and temperature and pulse falls, but inconvenient adhesions remain. In unfavorable cases collapse soon approaches. The abdomen becomes more distended. The pain and tenderness become aggravated, or sometimes entirely cease. Vomiting continues or even increases, and hiccup soon comes on. The temperature falls; the pulse is feeble, thready, and very frequent; respirations are about 40 or 50 in a minute; countenance deadly pale; cold sweats cover the body; the tongue and lips are dry; and the patient dies. In these cases there are no cerebral symptoms, except headache and sleeplessness; occasionally there is low muttering delirium. The tendency to collapse or to failure of circulation is extremely common in this disease, as in enteritis. When the effusion is great, the abdomen becomes distended, and ascites is said to result. Peritonitis very often leads to pleuritis of the base of the pleura, or after first week the disease becomes more chronic, pain lessens, tympanitis diminishes without moderating entirely, constipation and diarrhœa alternate, temperature and pulse sink, but not to natural. There is dulness at the dependent parts. Emaciation goes on, and fever wanes and waxes. In four or six weeks patient dies

Terminations.  
Favorable cases.

Unfavorable cases.



of exhaustion or reabsorption with slow convalescence occurs. In partial peritonitis there is no tympanitis, and the fever is more moderate. In chronic cases there is pain at stool, emaciation and fever towards evenings.

*Puerperal peritonitis* is a kind of fever which is generally accompanied by peritonitis. It is characterised by occurring chiefly in puerperal women ; it usually runs a very rapid course, and is associated with pyæmia, taking its origin in inflammation of the uterine mucous membrane. The disease is due to the fever poison expending itself on the peritoneum. In a few hours or a few days after parturition peritonitis sets in with rigors followed by fever, high temperature, and intense pain ; at first the inflammation is confined to the peritoneal portion of the uterus, subsequently it extends to the whole abdomen. There is suppression of lochial discharge and diarrhœa. Often vomiting is at first mucus and then greenish. If inflammation extends to the bladder there is frequent micturition. The disease is said to be due to the putrefactive poison in the blood, to the absorption of some of the products of inflammation of the uterus resulting from retention of a portion of the membrane, or of the placenta. It may also be due to direct contagium from one parturient female to another. In this affection the patient rapidly becomes collapsed. The symptoms are those of pyæmia and of local peritonitis combined. Patient becomes cyanotic, and apathy and death occur at the end of first week, or the disease may subside if cause be removed ; often after the first week the disease becomes more chronic, pain lessens, and tympanitis diminishes. The disease lasts from four to six weeks, when patients die of exhaustion, or reabsorption of fluid with slow convalescence occurs.

Peritonitis  
from perfora-  
tion.

*Peritonitis from perforation* is a most fatal disease, and occurs in persons who may be in apparent good health. In them there are perforating ulcers of the stomach, or

they suffer from rupture of the bladder or from perforating ulcers in the ileum, as in typhoid fever. *Symptoms* are those of severe and sudden pain in a particular part, as if something gave way, and are speedily followed by violent local peritonitis. There is an extreme and immediate collapse, cold limbs, cold sweats, extremely feeble pulse, fainting and vomiting. Many cases die within a few hours; such cases being mistaken for cholera if occur during the epidemic, but in this patients die of collapse before the supervention of diarrhœa. Such cases are due to sudden hæmorrhage into the stomach or bowels, to rupture of an internal aneurysm, or to rupture of the heart. Frequently, however, patients rally somewhat from the shock, when the symptoms of local peritonitis and of fever become well marked, and, after a few hours or a day or two, collapse reappears, and death results. In typhoid fever, dysentery, and enteritis, very often peritonitis from perforation occurs, but is not easily recognised. In such cases other abdominal symptoms mask the existence of perforation. Thus in typhoid fever the perforation occurs in the second or the third week when the patient is prostrate with diarrhœa, and becomes dull and insensible to all around him. In them there is no sudden collapse, and perforation is only evidenced by failing strength, increased feebleness and frequency of pulse, cold extremities, livid face, loss of power over limbs and sphincters, increased tympanitis and circumscribed tenderness in the abdomen.

*Diagnosis.*—Peritonitis is distinguished from *enteritis* by the absence of intestinal obstruction as gall-stones. From *colic* by the latter being unattended with fever, and pain relieved by pressure. Diagnosis.

*Prognosis.*—Often fatal, because of the cause. Prognosis.

*Treatment.*—The principles are to procure rest for the affected parts, to subdue inflammation, and to aid in removing the inflammatory products; if idiopathic lessen the Treatment.

force of blood by antiphlogistics. Some recommend application of ice to the abdomen. Support the patient's strength, and treat urgent symptoms. Absolute rest must be enforced, maintain the position instinctively assumed by the patient, and even avoid the weight of bed-clothes. The diet must be restricted to liquids ; the patient is to be kept in a dark but well-ventilated room ; opium should be freely given to quiet the action of the bowels and to procure sleep. It may be given by the mouth or by subcutaneous injection, and is the only remedy to save the patient's life. Locally, if the patient can bear, large linseed poultices besmeared with laudanum or belladonna may be advantageously applied to the abdomen. Complications, as vomiting and dysuria, must be relieved. Directly exhaustion sets in stimulants must be freely given. Give opium, and if patient survive for two or three days some hope may be entertained of his recovery. In this, as in other serous inflammations, avoid or use cautiously leeches, or venesection. Mercury is another remedy which should not be used without the utmost caution.

Chronic  
peritonitis.

*Chronic peritonitis* is rare as a sequel of acute. It is often an independent affection, and due to abdominal tubercles or strumous diathesis. It is common in strumous children, and in adults between twenty and thirty years, and in those who are debilitated by excesses and are hereditarily predisposed to phthisis often occurs as a result of repeated operations of paracentesis, and is associated with chronic diseases of the liver, stomach, or intestine or Bright's disease.

The peritoneum and abdominal lymphatic glands are a frequent seat of tubercles. They are often associated with *tabes mesenterica* or tuberculization of mesenteric glands. In this affection the deposit consists of both tubercular infiltration and miliary tubercles. The tubercles vary in size from a small almond to a small egg and occasionally

to a fist. Are liable to undergo calcification or softening. Occasionally adhesions take place between the mesenteric glands and folds of intestines, and often end in perforation of the bowel. The tubercular deposit is always secondary to tubercles of the intestines, or of the peritoneum. The tubercles are like minute grey points and undergo caseous degeneration, or may suppurate, or even rupture into the peritoneal cavity and may be converted into calcareous masses. In cases of children such tubercles are most evident through the abdominal walls.

*Morbid appearances.*—In cases of tubercles in the intestine, ulceration and perforation take place, the tubercles escape into the peritoneal fold, and lead to local peritonitis. Generally tubercular peritonitis is associated with tubercles in other parts, chiefly in the lungs. The tubercles may be miliary or grey, they are often associated with effusion of lymph and presence of false membrane. Within or immediately beneath the peritoneum, or in its fold which compose the omentum there are numerous miliary tubercles or granules; its anterior parietes are adherent to the subjacent structures. There is also deposit of lymph which glues the coils of intestines together and also covers the diaphragm, with the liver and spleen, the whole forming an inseparable mass. Most frequently the deposit is partial or only limited to the vicinity of a single organ. The deposit may present scattered granules within the fold of the peritoneum or may be thick, and the fold may be matted together by tubercular infiltration. In some cases the omentum is the chief seat of tubercles.

Morbid  
appearances.

It is a well established fact, that tubercular granules on the surface of serous membranes, do not perforate, hence adhesions between such tubercular membranes are extremely common. Where perforation and softening do occur the sub-peritoneal tubercles always tend to penetrate within the peritoneal cavity. Besides the tubercles we also find



redness of the serous membrane, effusion of fibrin or of dropsical fluid, and occasionally abscesses. The abdominal lymphatic glands, and more especially those in connection with small intestines are commonly tuberculous, and they lead to the deposits of tubercles. The mesenteric glands are enlarged, indurated, and often softened down in the centre.

Symptoms.

*Symptoms.*—Are obscure and vague especially in cases where the disease is complicated with tuberculosis in other parts, as the lungs, pleuræ, or intestines; they are also obscure where peritoneum is the sole seat of tuberculosis. Where the tubercles are chiefly confined to the peritoneum the symptoms resemble those of acute tuberculosis; in other cases they resemble chronic peritonitis. The *acute form* of tuberculosis is characterised by an indefinite period of lassitude, gradual loss of flesh and strength, followed by febrile phenomena. The abdomen is tumid, tender, and painful. There is disturbance of the stomach and bowels, as furred tongue, great thirst, loss of appetite, nausea and vomiting. Now and then there are paroxysmal attacks of pain or colic, more or less diarrhœa owing to intestinal ulceration. or constipation due to bands of inflammatory adhesions often leading to intestinal obstruction. In a few days, these symptoms are superadded with other typhoid symptoms, and the patient dies at the end of a few weeks.

Acute tuberculosis.

Chronic tuberculosis.

In the *chronic form* the symptoms closely resemble those of chronic peritonitis. In many cases the disease may commence with symptoms of acute peritonitis, and then merges into those of a chronic form. In another class of cases the symptoms are insidious from the first. The effusion of fluid takes place, and ascites is very apt to ensue, with occasional jaundice and anasarca of the legs.

Duration.

*Duration.*—The disease lasts for a few weeks or months. It may prolong for a year or two.

Diagnosis.

*Diagnosis.*—From typhoid fever, by the absence of rash

in the former, and the pain being limited to the right iliac fossa excludes the latter. The presence of tubercles in other parts, and the absence of regular morning remissions, and evening exacerbations of temperature, exclude typhoid fever.

*Prognosis.*—Tubercular peritonitis is, on the whole, a fatal disease. Prognosis.

*Treatment.*—The same as of scrofula generally, pay proper attention to the state of digestion. The constitution must be improved by vegetable tonics and cod-liver oil, suitable climate, and proper hygiene. To remove inflammatory products, preparations of iodine used both externally and internally are beneficial. A warm bandage over the abdomen causing equable pressure, also gives relief. Locally opium fomentations may be tried. If exhaustive diarrhœa occurs, check it at once. Treatment.

#### DROPSY ON THE PERITONEUM—ASCITES.

Ascites.

The word literally means leather bottle. Implying collection of fluid in one or more of the shut cavities of the body, or in the meshes of the areolar tissue, or in both.

*Causes.*—May be due to—1. Increase of external pressure in veins; 2. Diminution of albumen in blood; 3. Degeneration of peritoneum. It may arise from chronic peritonitis leading to effusion; may be an accompaniment of many organic diseases; occurs in those causes which interfere with the proper capillary circulation, or with the action of the lymphatics of the peritoneum; in all those diseases which lead to obstruction of the portal vein, as cirrhosis, cancer, or amyloid, or tuberculous diseases of the liver. In them ascites is only confined to the veins of the peritoneum. Those diseases which influence the systemic circulation generally, as aneurysm or a thrombus, by causing pressure upon the inferior vena cava, lead to ascites. Cardiac and renal diseases, or those which Causes.

impoverish the blood, as exposure to cold, suppression of habitual discharges, exhausting diseases, also lead to it. It may be a symptom of general dropsy.

Pathology.

*Pathology.*—During health all closed cavities and areolar tissues of the body are kept moist by a continual serous exhalation, which exhalation is also constantly absorbed. During disease, as dropsy, this balance is disturbed, either that the exhalation is too much, or that the absorption is much impaired. Dropsy due to defective absorption is known as chronic or *passive*, to excessive exhalation, active or *acute*. Ascites may be a part of general dropsy, or may exist alone. When alone, it may be due to obstruction in, or congestion of, the portal vein, or to the disease of the blood, or of the vessel. When ascites forms a part of general dropsy, it is due to obstruction to the return of blood in the inferior vena cava, as occurs in diseases of the heart, lungs, or kidneys.

Characters of fluid.

*Characters of fluid in ascites.*—It is generally clear, transparent, watery or faintly yellow, and of alkaline reaction, or it may be turbid, dirty looking, and mixed with fibrinous masses. Its quantity may vary from a few ounces to several gallons. It consists of much albumen and salts, trace of fibrin, urea, or of cholesterine. The peritoneum is dull and whitish looking.

Symptoms.

*Symptoms.*—The abdomen is distended, the fluid obstructs the circulation in the veins of the lower limbs, it impedes the movements of the diaphragm and also interferes with the action of the abdominal viscera, leading to dyspnoea and constipation. The mechanical pressure of the fluid upon the stomach causes discomfort, disturbed digestion, and sometimes vomiting; upon the heart leading to palpitation and tendency to syncope; upon the inferior vena cava to enlargement of the superficial veins of the abdomen, and to general anasarca of the legs; that upon the renal veins induces albuminuria. The patient walks

like a pregnant woman, with legs wide apart and head and shoulders thrown back. The upper part of the body is much wasted, the face is anxious and pinched, the general health deteriorated. He suffers from restlessness at night, from and great mental depression.

*Physical examination of the abdomen by inspection, palpation and mensuration.*—When the quantity of fluid is large, the skin of the abdomen appears smooth, shiny and thin, the superficial veins enlarged, the umbilicus everted, stretched and even obliterated, the belly is swollen, of a uniformly rounded form, and symmetrical in shape, and bulged out in one position more than another. Its greatest bulging being about the level of the umbilicus. The chest appears small and depressed, its lower margins are sharply bent outwards, the thoracic respiratory movements are only observed, the abdominal respiration is absent, the stomach and intestines float on the surface of the fluid, and hence are resonant on percussion. There is fluctuation from side to side. When the patient lies on his back percussion is dull at first behind, and only in flanks; gradually as the fluid increases, there is dulness in the lower part of the abdomen; around the umbilicus the percussion sound is generally tympanitic; the percussion note changes with the change of posture. An examination through the rectum reveals a feeling of resistance of the fluid, and through the vagina we observe the vagina short, and the uterus pushed considerably down or inverted, Sometimes the heart may be displaced.

Physical  
examination  
of the  
abdomen.

*Diagnosis.*—Abdominal dropsy may simulate tumours or other abdominal diseases. May be mistaken for ovarian dropsy. From a distended bladder, the passage of a catheter will diagnose it at once. From pregnancy, the history of the case and the application of the stethoscope to the abdomen will reveal foetal sounds, and thus exclude any doubt.

Diagnosis.



Diagnostic  
table.

## DIAGNOSTIC TABLE OF ASCITES AND OVARIAN DROPSY.

<i>Ascites.</i>	<i>Ovarian Dropsy.</i>
Dropsy is general or confined to the whole abdomen.	Begins on one side.
Abdomen broader than natural.	Abdomen not broad.
Appears at once or in a short time.	Only by degrees.
Is unsymmetrical; bulging of flanks; not adherent; fluctuation felt far beyond the limits of dulness.	Is diametrical, globular shaped, and adherent. Lines and limits of fluctuation correspond.
On percussion resonance above and at umbilicus. Most dependent parts in any given position are dullest.	No resonance above or at umbilicus. Dependent parts not always dull.
Intestines rise above fluid and to surface, or under abdominal walls.	Cyst rises in front of intestines.
Face pinched; upper part of body wasted; veins over abdomen enlarged; skin shining.	Face often healthy. Skin shining only if swelling intense.
General dropsy.	No general dropsy.
Dyspnoea; scanty urine; anasarca of lower limbs.	Disordered menstruation; frequent micturition; œdema of thighs and legs.
Resistance above and about umbilicus; vaginal and rectal examination only point to resistance of the fluid.	No resistance above and about the umbilicus, and vaginal and rectal examination point to tumour on one side and uterus not pushed down.

Three fallacies may interfere in the diagnosis:—1. Intestines may be tied down by mesentery so that an extremely small quantity of fluid will give dulness in the umbilical region. 2. An adherent omentum may strap down the intestines. 3. A previous tapping may have let air into an ovarian cyst. The general health is much affected in ascites, but little in ovarian dropsy.

Prognosis.

*Prognosis.*—Unfavorable when due to organic diseases.

Favorable if due to exposure to cold or weak state of the blood.

*Treatment.*—Remove the cause and promote absorption of the effused fluid if it be practicable. Thus, measures may be taken to increase the excretions from the skin, kidneys, and bowels. From the skin by hot vapour bath or by Turkish baths; from the kidneys by diuretics, such as iodide of potassium, copaiba, squills, digitalis, and various preparations of mercury. From the bowels by drastic purgatives, but they should be used with caution as they often affect health very injuriously. Very often the diarrhoea which results from their use becomes most difficult to be checked, and often causes death. Improvement of general health by tonics and good food, and the use of iron and cod-liver oil are beneficial. Locally the operation of paracentesis or an equable pressure should be used as a curative measure, and these often succeed where ascites depends on cirrhosis of the liver. In cases of cardiac or renal dropsy the operation affords only temporary relief. Treatment.

*The operation.*—The patient is laid on his left side along the edge of the bed, and the trocar with the cannula is introduced in a line midway between the umbilicus and the pubes. During the operation the abdomen should from the first be evenly and tightly bandaged. After the operation, an equable pressure should be kept on for two or three weeks. Immediately after the operation the patient feels comfortable owing to the withdrawal of fluid, and also from the abdominal viscera now beginning to react more freely and vigorously. There is great tendency to fill again. Operation.

### PHANTOM TUMOURS.

These occur generally in females. They vary in size, extent, character, and duration. In size they vary from a small orange to a foetus at the full period; may entirely or Phantom tumours.

Definition.

partially fill the abdominal cavity ; may be movable or fixed and stationary ; may be tender or insensible to the touch ; may persist for years or may shortly disappear.

**Causes.** *Causes.*—The distension of the intestines by flatus or excessive adipose deposit in the abdominal parietes are its causes.

**Symptoms.** *Symptoms.*—Patients are generally anæmic, and even hysteric ; they suffer from neuralgias and disordered menstruation, from general uneasiness, mental depression, and indigestion.

**Diagnosis.** *Diagnosis.*—These swellings often shift their position. and have been mistaken for movable kidney. In phantom tumours percussion is resonant, there is considerable arching forward of the spine of the abdomen ; the symptoms of ovarian and uterine irritation are also present. If chloroform be given the swelling gradually melts away, and as consciousness returns the tumour forms again. In movable kidney there is absence of one kidney from its position. (For full information refer to Movable Kidney.)

**Treatment.** *Treatment.*—Health must be improved by mineral acids, by vegetable and other nervine tonics, and by a good nourishing diet. Digestion restored by stomach tonics. A change to the sea-side and salt-water baths are beneficial.

Morbid  
growths.

### MORBID GROWTHS.

Malignant growths sometimes commence in the peritoneal tissue. The *scirrhus* is common, and chiefly invades the subserous tissue, appears at first as hard spots scattered irregularly, but soon coalesce and form large patches. These have a tendency to spread. The callous cancer appears as a group of vesicles and form scattered growths. These have a tendency to spread on surface and increase in depth, they involve sub-peritoneal tissue, which becomes thick ; they often extend to the muscular and mucous coat of the

stomach and bowels. When extensive the great omentum becomes converted into a large lobulated mass, or becomes contracted, as in scirrhus, into an irregular transverse band. The *encephaloid* is a soft milky outgrowth, very rapid in its extension, appears as small hemispherical nodules. These are more prominent than the scirrhus, and rapidly invade the peritoneal folds, and also invade the subjacent organs. In some cases the whole of the peritoneum is found studded with small bunches of currant-like excrescences.

Encephaloid.

*Symptoms.*—The affection is generally associated with a similar disease of the neighbouring and adjoining viscera, and hence the symptoms are of a mixed kind. These are nausea, vomiting, loss of appetite, constipation or irregularity of bowels, and more or less pain in the abdomen. With these the existence of a tumour in the abdomen, and its rapid enlargement, are characteristic. The tumour may occupy any region, may be fixed or movable, hard or soft, and fluctuating, and when over any vessel may even pulsate.

Symptoms.

*Diagnosis.*—May be mistaken for an abscess, hydatid tumour, floating kidney, or an aneurysm. The presence of ascites or of subacute peritonitis, the implication of gastro-hepatic omentum, and the obstruction of portal veins, also of common bile duct, and consequent jaundice, and swelled feet include malignancy, and exclude other affections.

Diagnosis.

*Treatment.*—It is only palliative. The urgent symptoms may be attended to and pain relieved by opiates. The patient should be supported by nutritious diet and stimulants.

Treatment.

## DISEASES OF THE LIVER.

Diseases of the liver.

*Anatomy.*—Healthy liver occupies the right hypochondrium, the epigastrium, and part of the left hypochondrium. It is convex above, where it is well adapted to the

Anatomy.



under surface of the diaphragm. It is divided into two lobes. Its anterior border occupying some portion of the right and left lobe, a portion of it could be felt in the upper part of the epigastrium ; the remainder being concealed by the lower margin of the right ribs. The position of the liver varies with respiration, it descends with the descent of the diaphragm, and also during sitting or during upright posture. Its upper or convex surface is higher on the right than on the left side. The determination of enlargement or contraction of the liver necessitates an exact acquaintance with its normal position.

Area of hepatic dulness.

*Normal area of hepatic dulness.*—*Upper margin.*—In median line, the base of ensiform cartilage overlaid by 1 inch of lung. In right mammary line, the fifth intercostal space. In right axillary, the seventh intercostal space. In right dorsal, the ninth intercostal space. *Lower margin.*—In right mammary line, the costal arch. In right axillary line, the tenth intercostal space.

The liver is the largest gland in the human body. It measures twelve inches in the transverse diameter, and between six and seven inches in the antero-posterior. Its weight in healthy adults is fifty ounces, or nearly the weight of the brain. It increases in size during digestion. It is highly vascular, and the blood passing through it is both arterial and venous. It is supplied by branches of the portal vein, hepatic artery, hepatic vein, biliary ducts and lymphatics ; the arterial blood is for the maintenance or nutrition of the organ. The venous blood or the blood which has returned from the stomach, intestines, pancreas, and spleen contribute to the performance of its functions. The arterial blood circulates through the hepatic artery and the venous through the portal vein. Both bloods traverse the liver and ultimately reach the hepatic vein, which empties into the inferior vena cava. The portal vein carries the blood from which bile is to be secreted. The bile duct

separates the bile which is generated by the hepatic cells from the portal blood. The liver is made up of a multitude of lobules, and each represents an elementary liver. Each lobule consists of blood vessels and of hepatic cells. Blood reaches the circumference of a lobule through minute branches of portal vein; these divide and subdivide and form capillaries, which again converge as they reach the centre of the lobule, and ultimately terminate in the hepatic veins. The hepatic arteries join these converging capillaries and they reach the hepatic veins. Thus, a lobule is composed of hepatic cells closely interwoven with capillary vessels. Each cell consists of nucleated particles, fat globules, and pigment granules. The branches of the hepatic duct on emerging from the lobules unite with each other till they form a single duct. This duct coursing downwards towards the duodenum is joined by a cystic duct, which thus connects it with the gall bladder. This common duct is called *Ductus communis choledochus*. According to latest observations, the liver has three distinct offices to perform. 1. The starchy and saccharine elements of food are brought to the liver by portal vessels, and converted into glycogen or a substance resembling dextrine, and into a substance convertible like dextrine into sugar only, when acted upon by albuminoid ferments. The glycogen or the substance convertible into sugar is stored into the hepatic cells. During fasting this stored-up sugar is removed by the hepatic veins and circulated into the whole body. It thus becomes a useful agent in the maintenance of animal heat, by its being converted into carbonic acid and water into the lungs. Glycogen also takes part in the growth, development and functional activity of the hepatic cells. It also assists in the development of the white corpuscles of the blood. It is readily converted into fat, and may thus become the source of accumulation of fat or oil into the hepatic cells, or in other parts of the body.

Anatomy of  
a lobule.

Physiology  
of the liver.

Glycogen.

2. The albuminoid elements of food, or the albumen and fibrin from the blood, are carried into the liver, and are there converted into glycogen and effete matters, as *leucine* and *tyrosine*. These effete matters are ultimately resolved into uric acid and urea, and thus excreted with the urine.

3. The secretion of bile. Bile is an important agent in the saponification and absorption of fats, and in the assimilation of albuminous matters of food. It promotes peristaltic action of the bowels and arrests decomposition. It also serves as an excretion, but a greater bulk of it is reabsorbed.

Gall-bladder. Gall-bladder is a receptacle for the retention of bile, when it flows into the intestine, it is not immediately required for digestive purposes. In the bladder it is of a dark colour, owing to admixture with mucus. As secreted by the liver it is a clear fluid, of more or less viscid consistence, and of a colour varying from green, brown, to yellow. The colour is, owing to the presence of a pigment, called *bilirubin*. The pigment readily undergoes oxidation and thus change of colour results. Bile is of a bitter taste. When fresh it has a very little odour, and is slightly alkaline. Its sp. gr. is 1020 to 1030, and is prone to rapid decomposition. It consists of solid resinous matter and colouring ingredients, small amount of cholesterine (which is crystallizable), non-saponifying fat, fatty matter, mucus salines, and water. Cholesterine is a main constituent of biliary calculi. The resinous matter, on analysis, is found to consist of *glycocholic* and *taurocholic* acids, combined with soda. There are two kinds of colouring matter, brown and green.

The flow of bile is said to be continuous, its minimum flow being at the period of fasting. Its flow increases with the food and continues till the completion of digestion is reached. About forty ounces are secreted in twenty-four hours. The colouring matter plays an important part in

the excretory process as is shown by its forming part of the meconium in children, and being a constituent of alvine evacuations in general. The colourless evacuations are the result of bile being prevented from flowing into the intestines. When the bile is obstructed, although it is formed, the obstruction gives rise to jaundice and thus the excreted bile is discharged by other channels as urine, &c. Besides the uses already enumerated bile as a secretion assists digestion. The alkali it contains serves to destroy the acidity of the gastric juice after it is no longer required. Bile also serves as a stimulus to excite the glandular follicles and promote their secretions and to give the stimulus which excites muscular fibres of the intestines to increased peristaltic action, hence, in cases where bile is obstructed, there is constipation; where the secretion is copious diarrhœa is the result. The secretion of bile may be increased or diminished. Is increased by rich food, spices, and strong spirits, also by indolence and heat. It is diminished by light diet. Avoidance of spirits, exercise, and temperate climate also lessen its flow. Medicines which increase the secretion of bile are—mercury, podophyllin, taraxacum, rhubarb, hydrochlorate of ammonia, copaiba, &c. Those which diminish the secretions are iodide of potassium and opium.

## DISEASES OF THE LIVER.

Diseases of  
liver.

These diseases are divided into those due to enlargement and those due to contraction. They are further subdivided into enlargements with or without pain, and contractions with or without pain.

Clinically considered, diseases of the liver give rise to, 1. Morbid sensibilities varying from discomfort to different kinds of pain, with or without tenderness, and sympathetic pain in the right shoulder. 2. Changes in the quantity and quality of bile, which may be in excess or

Clinical  
history.



of improper quality and acting as an irritant. 3. Obstruction to the portal circulation, or congestion of the portal veins, and as a consequence derangement of the stomach and bowels, hæmorrhages, distension of the superficial veins of the abdomen, ascites, enlargement of the spleen, and occasionally result hæmorrhoids. 4. Enlargement of the liver, the pressure of the liver upon the diaphragm, and on the vena cava and duodenum, leading to their derangement. 5. Jaundice. 6. Dropsy. 7. Enlargement of the spleen.

Enlargement  
of liver.

#### ENLARGEMENT OF THE LIVER.

The enlargement of the liver may be painful or painless. An increase downwards of the hepatic resistance may be produced without true enlargement by several conditions. Thus the liver is larger in early life than in adults, it does not grow in proportion with the rest of the body. In rickets and pigeon breast the organ is depressed and elongated vertically from compression of the chest walls. In tight lacing it is a most common condition, and it varies with the situation and the duration the tightness is practised. In chest diseases, in pleural effusions, emphysema and bronchitis, and in chronic heart diseases, also from any morbid growth or collection of fluid in the right hypochondrium the liver is pressed down. Similarly in cases of ascites, ovarian tumour, and in cases of abdominal aortic aneurysm it is pushed upwards.

The painful enlargements are due to congestion, catarrh of bile ducts, obstruction of common duct and retention of bile, also hepatitis, tropical abscess, and cancer. The painless enlargements are due to amyloid and fatty degeneration and hydatids.

Physical  
examination.

*Physical examination* of an enlarged liver may reveal increased area in front. This may be upwards and downwards. The increase upwards may be simulated by pleuritic

effusions or solid lung. The liver is not enlarged upwards alone. The downward enlargement may be simulated by depression of the liver by dilated heart, by diseases about the diaphragm, great pleural effusion, pulmonary disease, by tight lacing or rickets; by other abdominal tumours as the renal or the omental. True enlarged liver feels massive and dense as against mere displacement. Its edges feel sharp or round, even or uneven, hard or soft. The surface feels even or uneven. The enlargement may be general or local.

*Inspection.*—In enlargement we notice a bulging close to the lower borders of the left ribs. On *palpation* the organ is somewhat movable. *Percussion* denotes increase in extent and character of dulness with considerable sense of resistance. The ordinary extent of dulness can be traced in a curved line upwards, and between the fifth and sixth rib. It is four inches in the right mammary line, five inches in the right axillary line, four inches in the right dorsal line, *i.e.* lines drawn respectively from the centre of axilla and from the lower angle of the scapula. Three or four inches in the median line anteriorly corresponding to the base of the ensiform cartilage. The enlargement is altered by deep breathing and by the movements of the diaphragm. The enlargement of the gall-bladder can be felt under the margin of the liver, somewhat superficial, and is in the form of a cone with the base towards the surface. Its surface is smooth, elastic, fluctuating, and movable from side to side.

*Causes of Enlargement.*—These are—1. Sanguineous congestion which may be mechanical, and associated with valvular disease or dilatation of the heart. It is mostly associated with increase of fat in the liver, as best seen in *nutmeg* liver. In this condition (*a*) the surface is smooth, (*b*) the enlargement is general, but not great, (*c*) there is slight jaundice, and (*d*) portal congestion is considerable. 2. *Biliary congestion.*—The congestion is

Inspection.

Causes of  
enlargement.  
Sanguineous  
congestion.Biliary  
congestion.

- mechanical and due to impediment in hepatic or common gall duct (a) The enlargement as above; it is generally considerable, but not massive; (b) surface smooth; (c) jaundice intense and gall-bladder distended; (d) no portal congestion unless portal veins are involved. 3. *Fatty liver*.—It occurs especially in phthisis pulmonalis; (a) Liver may be massive, enlargement general; (b) surface smooth; (c) no jaundice; (d) no portal congestion when the affection is uncomplicated. (4) *Amyloid liver*.—Occurs especially in cachexia and chronic suppurations; (a) the enlargement is massive and general, (b) the spleen and lymphatic glands are also enlarged; (c) there is no jaundice, and (d) no portal congestion unless there are amyloid lymph-glands in the hilum; (e) sometimes general moderate anasarca due to cachectic state of Bright's disease. 5. *Cancer*.—It involves the whole of the liver. (a) The enlargement may be generally massive or may involve a part of it; (b) the surface is mostly nodular, and the edge is somewhat uneven; (c) there is no jaundice and (d) no ascites unless large branches of bile-ducts or of portal veins are implicated. Where bile ducts are affected both jaundice and ascites may be very great and are mostly associated with general cachexia. 6. *Cirrhotic enlargement*.—(a) The liver may be sometimes massive; (b) the surface and edge uneven; (c) jaundice moderate; and (d) portal congestion may be wholly absent, or when present there is associated ascites; (e) the spleen is enlarged, and (f) hæmorrhages from the stomach and bowels occur. The general condition is mostly fat. In cirrhosis on the whole the illness is much more chronic than in cancer. 7. *Hydatids*.—Where there is local bulging perceptible the diagnosis is easy. There is general enlargement when the hydatids are deep seated. They cause no special symptoms, and the liver is simply enlarged. The percussion may make out that the upper margin is not even. 8.
- Fatty liver.
- Amyloid liver.
- Cancer.
- Cirrhosis.
- Hydatids.

Hepatitis and tropical hepatic abscess are common in India, and are also causes of local enlargement. 9. Syphilitic tumours, as gummata, are met with in enlarged liver.

### JAUNDICE (ICTERUS).

Jaundice.

The most important results of hepatic diseases are those connected with the derangement or suppression of bile.

*Icterus*, the Latin term for jaundice, literally means a golden oriole or a bird of bright yellow plumage. The ancients believed that a sight of this bird, by a jaundiced person was death to the bird and recovery to the patient. Jaundice is not a disease in itself, but is a symptom of many diseases. It merely means a peculiar discoloration of the skin, conjunctivæ, and other secretions, owing to the circulation of bile pigment with the blood, to the decomposition of bile in various tissues and to the separation of its colouring matter by various emunctories. But bile contains other ingredients besides colouring matter. Thus in jaundice blood contains bile and also effete products derived from the albuminous matters of food, as leucine and tyrosine.

Definition.

*Causes.*—Very often an appearance like jaundice is due to causes unconnected with the secretion of bile. Thus in chlorosis the surface has a greenish yellow colour. A similar yellowish condition of the skin is also noticed in cases of cancer in which the liver is not attacked. New-born children have a yellow hue of skin a few days after birth. In Addison's disease a similar colour exists. All these spurious discolorations can be readily diagnosed from true jaundice.

Causes.

*Pathology.*—Jaundice is said to arise in one of two ways. When it results from some *mechanical obstruction* to the flow of bile into the duodenum, bile is retained in biliary passages, and consequently reabsorbed into the blood. The mechanical obstruction in the hepatic or common duct may be

Pathology.

Mechanical obstruction.



(a) impaction of foreign bodies in the duct as gallstones, inspissated bile, hydatids, and flukes, or foreign bodies from intestines; (b) organic or inflammatory changes in the walls of the duct and its orifices as stricture; (c) pressure of tumours of various kinds within the liver, pressure of tumours on orifices of hepatic duct from without, as of tumours of the liver, or of glands in the hepatic fissure; of tumours of the stomach, pancreas, or kidneys, of omental tumour, abdominal aneurysm, pregnant uterus, ovarian tumour or of fæces in the colon. Catarrh or mechanical obstruction of the common duct is the cause of jaundice in all these cases. Cases of jaundice without impediment or mechanical obstruction are to be found. In these cases jaundice is probably the result of a suspended secretion. It is said that during health some portion of the bile is always re-absorbed into the system and transformed, so that no trace may be discovered in the blood or in the urine, and some part of it passes away with the fæces. That in disease this transformation does not take place and jaundice is the result. The causes which lead to such morbid conditions are by some authors supposed to occur from certain blood poisons, as pyæmia, of yellow fever, of famine fever, snake-bite or of viper, the poison of arsenic, mercury, antimony, chloroform, ether, phosphorus, copper; and also protracted constipation, cause jaundice. Jaundice also occurs in various organic diseases as congestion, acute or chronic atrophy of the liver. In them jaundice is associated with destruction of the hepatic cells which are consequently unable to discharge their functions. The theory of jaundice occurring in cases independent of obstruction is rather hypothetical, and it is believed by some that in such cases jaundice is due not to the agency of the liver, but to the changes in the colouring matter of blood which closely resembles bile. Others are of opinion that the bile is secreted by the liver, and absorbed by the blood, but that

Non-obstruction.

Theories.

as at the mucous surface of the bowels the necessary changes are not effected jaundice results. It must be remembered that in cases of jaundice due to non-obstruction, the jaundice is not intense and the biliary acids are absent in the urine, but the effete products due to the changes of albuminous matters into leucine, tyrocine, &c., exist. These accumulate in the blood and are excreted in the urine. In cases of jaundice due to obstruction the biliary acids are found in urine.

*Morbid appearances.*—The skin and conjunctivæ are stained with bile pigments, also most of the fluids and tissues and organs of the body. The intensity of jaundice varies in different tissues. In recent cases of obstruction of common bile duct the liver is uniformly enlarged, without any change in shape, its colour is deep olive yellow, and the ducts are distended. The gall bladder is also enlarged. In long continued cases the liver becomes degenerated, soft, and atrophied, and particularly in the case of phosphorus poisoning the cells are granular and studded with oil, or are destroyed. Next to the liver, the skin is most jaundiced. Where jaundice is independent of obstruction, some believe that the bile is frequently vitiated and dark, the jaundice is of a greenish hue, owing to the absorption of bile pigment or to imperfect arterialisation of blood. Such cases are most serious. The liver is often diminished in size, and altered in shape and structure.

*Symptoms.*—The disease often sets in with excruciating pain about the pit of the stomach, and the pulse is slower than natural. The pain is, perhaps, not due to the liver, but to stretching of that portion of the duodenum which is affected in the disease. The pain is intermitting, and is generally before the yellowness appears. Diarrhœa may be present, and there are also fits of shiverings; often a bitter taste is complained of. The milk is said to be unstained in jaundice. There are external discoloration of the skin and

Morbid  
appearances.

Liver.

Symptoms.

Pain.

Colour of  
skin.

conjunctivæ, yellow urine, and pale clay-coloured stools with tendency to constipation, flatulence, fœtor of the evacuations, faulty assimilation of fat, and the patient has also distaste for fatty food. The colour of the skin varies with the age, amount of fat in the epidermis, and complexion. It may also vary from day to day with the diet, and with the activity of the bowels and kidneys. Serous membranes and effusions, the connective tissue, the fibrous tissue, fat, muscles, and even bones, all become tinged. The mucous membrane and its secretions are generally free. The brain and nerves are also unaffected. Besides the secretions from the skin and kidneys, others as the saliva and tears from the inflamed mucous surfaces, as the conjunctivæ, are also tinged with bile. The urine is characteristic. Its colour varies from a light saffron to that of porter; on standing it generally becomes green. It also stains the clothes yellow.

Urine.

Chemical  
tests.

*Chemical tests.*—It contains bile pigments and bile acids. *Of bile pigments.*—Nitric acid test.—When a drop of urine and a drop of nitric acid are brought into contact, changes of colour are observed as violet, green, blue, and red. *Of bile acids.*—To the urine in a test glass add a piece of sugar, and then pour over it strong sulphuric acid, and you will find a deep purple colour where the acid and the urine meet.

Itching of  
skin.

Besides acids and pigments urine also contains leucine and tyrosine, which are only detected by the microscope. The retention of bile acids in the blood leads to itching of the skin. Sometimes all objects appear yellow to jaundiced patients. Vitiligoidea or xanthelasma may be present. The action of the heart is feeble, and in such cases the temperature is below normal; the pulse is slow; spirits dull and low; delirium, irritability, and even drowsiness occurs. In advanced cases emaciation becomes well marked. In obstruction due to gall-stone the suffering

may be intense and the pain is known as biliary colic. Vomiting and hiccough frequently accompany it. Death occurs by exhaustion.

In cases of jaundice due to non-obstruction, typhoid and low nervous symptoms, as stupor and delirium, occur, and dangerous hæmorrhages, as petechiæ, or epistaxis, or hæmorrhage into the alimentary canal, end speedily in death.

*Duration* is uncertain, may be two or three days or many weeks. Duration.

*Diagnosis of suppression or obstruction from reabsorption or non-obstruction.*—In obstruction biliary acids have been found in the urine, but there are no effete products known as leucine and tyrocinine. In non-obstruction urine contains both. In both forms we have yellow conjunctivæ and skin, and the serum of a blister will be yellow. The stools are clay coloured, and urine yellowish brown. Diagnosis of suppression or obstruction.

*Prognosis.*—When due to diseases of the liver it is dangerous. Cases of non-obstruction are more grave, also where the obstruction is due to cancer. Prognosis.

*Treatment.*—Relieve the pain. In cases of deficient bile, as in constipation, promote the secretion by means of ox gall if possible. Where bile is excessive, as in catarrh, limit its formation. The diet must be attended to. Avoid fat, oil, sugar, and spirits. Try to promote the urinary and the cutaneous excretions. Attend to the general health, and to the hygienic measures. If jaundice be due to obstruction from biliary calculi hot poultices to the hypochondrium are recommended. Relieve the pain by hypodermic injections of morphia and by free doses of opium. Chloroform inhalations may be tried. Treatment.

## OBSTRUCTION OF THE HEPATIC DUCTS.

Obstruction of the hepatic ducts.

Is a most frequent cause of jaundice, and is often met with in many diseases of the liver.



## Causes.

*Causes.*—The obstruction may be due to inflammatory exudation upon the mucous membrane of the duct, to the accumulation of inspissated mucus, to polypi or other growths, or to impaction of calculi. It may depend on *compression* upon the duct, as (*a*) in inflammation of Glisson's capsule, (*b*) by syphilitic, cancerous or other growths in the liver, or (*c*) by inflammatory exudations into the liver, (*d*) aneurysms or other growths in the stomach or enlarged pancreas also give rise to obstruction. The obstruction leads to the arrest of the flow of bile, to alterations in the character of bile, to dilatation of the ducts, and to the degeneration of the hepatic cells. When the common bile duct is obstructed other portions of the duct beyond obstruction dilate considerably, and the gall bladder is shrivelled up. As a consequence, the bile is thin and watery, of a dark green tinge, and may be turbid from admixture of mucus or pus. The walls of the ducts are thickened and in some cases ulcerated owing to the obstruction. The liver is gradually enlarged. After a time it becomes atrophied, soft, and flabby, and on pressure yields greenish fluid. Under the microscope the cells are found to be stained with bile; they also contain oil globules and granular pigment matter. In some cases the cells are degenerated.

## Symptoms.

*Symptoms.*—These are divided into—1, those in which there is absence of bile in the fæces; 2, those due to changes going on in the liver; and, 3, those due to accumulation of bile and effete matters in the blood. The absence of bile in the fæces is shown by slate coloured stools. The liver is enlarged at first, and the gall bladder is also distended, and can be felt as a fluctuating tumour in the hepatic region, and there is gradual increase of hepatic dulness. At a later stage the liver is atrophied, and there is general shrinking of the organ, and the liver could then be grasped between the fingers and the thumb. The

accumulation of bile gives rise to jaundice, which is very intense. The urine within twenty-four hours is found to contain bile pigment, and in a day or two there is yellowness of the conjunctivæ, and also of the skin. In advanced cases we find yellow vision (*vitiligoidea*), itching and eruption of the skin and hæmorrhages. With all this severity of symptoms there is no rise of temperature, and no loss of appetite.

*Duration*.—Patients generally die in a few weeks, but may live for two or three years. Death occurs from rupture of the duct, or of the bladder, leading to peritonitis, sometimes from hæmorrhage, sometimes from inflammation of the liver ending in suppuration, sometimes from general exhaustion. Duration.

*Complications*.—Head symptoms: pneumonia, dysentery, and dropsy. Complications.

*Terminations*.—Where recovery takes place it is known by the return of bile in the fæces. The skin becomes clearer, bile pigment disappears from the urine, and the general health improves. Terminations

*Treatment*.—Find out the cause of obstruction and if practicable remove it. The other treatment is mainly hygienic. The bowels should be regulated, the functions of the skin and kidneys promoted by diuretics, warm baths or Turkish baths, and even by warm clothing next the skin. Appetite should be improved by vegetable tonics. The complications, as head symptoms or diarrhœa, must be removed. Treatment.

## HYPERÆMIA OR CONGESTION OF THE LIVER.

Hyperæmia.

It consists of enlargement of the liver. In it the amount of blood in the liver is increased by greater *afflux* or by impeded *efflux*. The first is hyperæmia, the second congestion. The liver is quite painless. The condition Afflux.  
Efflux.

is consistent with health. Thus, healthy congestion may be influenced by saccharine food or by drink. When congestion exceeds this boundary disease is said to result. Hyperæmia or fluxion may arise: 1. From increase of lateral pressure on portal vein. At each digestion the fluid in the intestines causes increased fulness of the intestinal and so of the portal veins. 2. After relaxation of parenchyma from dilatation of the capillaries as in injuries. 3. From malaria. Congestion is more frequent than hyperæmia, and may be like other congestions, active or passive. The *active* may be due to errors in diet, to excessive heat, to sudden chill while the body is heated, and to engorgement of bile-ducts. The *passive* depends on—1, morbid states of the blood; 2, suppression of habitual discharges, as catamenia, bleeding from piles, or obstinate constipation; 3, mechanical obstruction to the flow of blood from the veins, as in organic diseases of the heart and pericardium, which induce obstruction to the escape of blood from the veins; 4, enfeebled action of the heart; 5, all valvular diseases and dilatation of the heart. In them congestion is most common in those of the right side, next in those of the mitral, last in aortic diseases; 6, acute and chronic diseases of the lungs, emphysema and effusions in the pleura; and, 7, compression of vena cava by aneurysm, &c.

Causes.  
Fluxion.

Post-mortem  
appearances.

Congestion.

Enlargement.

*Post-mortem Appearances.*—The whole organ is swollen and uniformly enlarged, is hyperæmic, and more or less of a dark hue. The enlargement is rarely great. When engorgement is venous and due to mechanical obstruction of the circulation, the enlargement is greater than when congestion commences in the arteries. The enlargement disappears after a time. The capsule is distended, the liver is smooth on its surface, is unusually firm, and its anterior margin prominent. The shape is unchanged. On section the cut surface is evenly dark red or spotted, owing

to hepatic congestion, and blood flows freely from the cut surface. The congestion may be general or limited to certain regions. At first congestion is uniform, but if continued for some time other changes manifest themselves, and the liver becomes of a well-known *nutmeg* character. In *portal* congestion the hepatic veins are distended and overloaded with blood, the circumference of the lobules corresponding to the portal veins become anæmic, and have undergone degenerative changes. The liver is enlarged, granular, indurated, and the capsule thick. On section the liver presents opaque buff-coloured patches of intense congestion. This is owing to the circumference, or the portal portion of the lobules being more or less loaded with oil and probably coloured with bile, while the central or venous hepatic portion of the lobules is free from degeneration, and is deeply congested. There is also dilatation of small branches of hepatic veins within the lobules and atrophy, and disappearance of hepatic cells. Portal congestion may also be noticed in cases of cancerous or lardaceous nodules in the liver and in cirrhosis.

Nutmeg  
liver.

*Symptoms.*—There are none till the case is well advanced. When the liver is much enlarged the right hypochondrium feels full. The sufferings of the previous heart or lung diseases are increased. There is a feeling of discomfort, with pain in the hepatic region, increased by movement, by pressure, and by respirations. There is little or no jaundice, the spleen is enlarged, and occasionally there is slight dropsy. Patient complains of fulness and discomfort after food, disinclination to work, and of headache. There is occasionally a slight pain in the right shoulder. At first the stools are clay coloured, but after two or three days the motions contain bile. There is nausea, furred tongue, headache, bitter taste in the mouth, vomiting and diarrhoea. The diarrhoea is partly due to congestion of the stomach and intestine, and partly to the unhealthy quality of bile; the

Symptoms.



urine is scanty, high coloured, and loaded with urates, and sometimes contains colouring matter of bile; it often deposits lithates. With deranged digestion there is anæmia, or general debility, emaciation, and dulness of spirits. Often there may be dyspnœa, cough, hæmorrhage from the stomach and intestines, and even ascites.

Physical  
examination.

*Physical examination.*—The liver is moderately enlarged. It is uniform in shape, and smooth over the surface.

Inspection.

*Inspection.*—Slight bulging in the right hypochondrium *palpation*, the edge cannot be clearly made out, but great extent of resistance than natural is felt; *percussion* shows extension of dulness. As a rule, congestion often comes on in progress of disease of the heart or lungs; such enlargements rapidly appear and rapidly diminish. In this disease relapses are very common, and they often lead to permanent congestion or atrophy.

Treatment.

*Treatment.*—Relieve congestion of the portal system and for this purpose mild mercurial aperients, or saline purgatives act favourably. In advanced cases, if the urine be scanty, copaiba, or benzoate of ammonia gives relief. Relieve portal system by hot poultices and leeches above the anus. In active congestion remove the exciting cause, as high living, leave a malarious locality. An emetic may be useful; irritating articles of diet should be avoided, saline aperients, and even removal of a little blood may produce good results. For gastric derangements give alkalies or alkaline salts with vegetable acids. Hydrochlorate of ammonia is most useful in these cases. Ipecacuanha, from its effects to increase secretion of the liver and skin, may be used with success. It is most useful in the hands of Indian practitioners. During convalescence give good diet, mineral acids, and taraxacum, with nux vomica and even cinchona.

## INFLAMMATION OF THE LIVER.

Inflamma-  
tion of the  
liver.

*Acute interstitial hepatitis* is an extended form of fluxion, and includes inflammation of the connective tissue of the liver, of the lobules into the meshes of which hepatic cells are lodged, or of the serous investment of the liver, or of both combined. It is a most common disease in India, and is characterised by pain in the hepatic region, increased by deep inspiration, coughing, and by change of posture; by sympathetic pain in the right shoulder; febrile phenomena; and occasional jaundice. The liver is uniformly enlarged, the enlargement being more extensive than in simple congestion. The surface is smooth or slightly uneven, and is dense and resisting. The disease may terminate in resolution. Very often it ends in suppuration known as *tropical abscess*; the experience of persons living in the tropics is very much in favour of this termination.

*Suppurative hepatitis or pyæmic tropical abscess.*—In this affection at first the liver cells swell from imbibition of an albuminous substance, then follows disintegration of cells and of the parenchyma, finally cavities filled with disintegrated tissue elements are formed.

Suppurative  
hepatitis.

*Causes of suppurative hepatitis:*—1, Thrombosis of veins; 2, those already enumerated as causes of congestion, as direct injury, ingestion of too stimulating articles of diet, alcoholic drinks; 3, the transmission of poisonous matters from the ulcers of the intestines, as in dysentery; 4, malaria may be a cause in connection with infectious fevers and pyæmia; 5, may affect the liver by extension of inflammation from other parts. The disease is common in the tropics and in India. It chiefly affects persons between fifteen and fifty-five. Though more frequent in the indolent and intemperate, the occurrence among the active and temperate is not less common.

Causes.

Morbid  
appearances.

Intestinal  
hepatitis.

Suppurative  
hepatitis.

Idiopathic  
abscesses.

*Morbid appearances.*—In acute hepatitis the entire organ is not inflamed, on section we find only inflamed spots. Liver presents increased vascularity, and the vessels are dilated, and there is increase of leucocytes; the cut surface is redder but softer than natural, and blood oozes out more freely. In advanced cases exudation of lymph takes place in the walls of small vessels and in the connective tissue, and also in the interstices of the inflamed part. The hepatic cells are also swollen and cloudy, and they contain fat. In favorable cases, if the lymph be quite liquid or coagulable, it soon becomes reabsorbed, but if solid it becomes organised into fibrous tissue, or as in some cases reliquifies and disappears. In unfavorable cases the lymph is corpuscular and degenerates into pus. In *suppurative hepatitis* the tissue surrounding the lymph also becomes soft, and thus the whole inflamed portion becomes surrounded by a lowly organised membrane. This constitutes an hepatic abscess. As the case progresses more lymph is effused, and which also, like the first, degenerates into pus and thus it distends the surrounding membrane. The liver is considerably enlarged, the surface is smooth, the margins regular, and there is a feeling of fluctuation surrounded by a ring of induration. Inflammation often spreads into the serous covering of the inflamed portion of the liver, the membranous coats now become adherent, and the abscess either points externally or opens into the lungs or intestines. The abscess may vary from the size of a pea to that of an egg; may be single, or several abscesses coalesced, may be superficial or deep seated. The right lobe is more frequently affected than the left. They are often surrounded by disintegrated and discoloured liver substance. The contents may be healthy creamy pus or pus mixed with bile or blood; may be foetid and decomposed.

*Idiopathic* abscesses are generally single, or may occur in small numbers; when numerous, they are of a pyæmic

origin. An abscess may open into various ducts which go through the liver. Its contents may be conveyed into the portal vessels and an embolus may be lodged in some distant part. When conveyed along the hepatic duct the contents may discharge into the bowels. Sometimes the abscess may open externally or into the peritoneum, gall-bladder, hepatic duct, stomach, portal vein, or inferior vena cava. It rarely opens through the diaphragm into the chest (pleura, lungs, or pericardium). Often the abscess leaves a cicatrix or causes contraction and depression of the surface of the liver, or a cavity with calcified pus forms.

*Symptoms.*—In the early stage the symptoms of hepatic hyperæmia are—the patient is slightly jaundiced ; the face is sallow looking ; there is occasional marked redness of the cheeks ; he has dislike for food and suffers from nausea and vomiting. The bowels are constipated, the urine is scanty, high coloured, and loaded with lithates, and there is fever preceded with chills. When inflammation becomes established there is high fever, defective respiratory movements, a feeling of weight, pain, and tenderness in the liver, sometimes pain in the right shoulder, and there is increase of hepatic dulness. The inflammation may end in resolution or suppuration in the second week. When it goes on to suppuration the liver is considerably enlarged ; the enlargement is not uniform ; its dulness will vary with the seat of abscess ; frequently, if the abscess be large, there will be obliteration of the intercostal spaces, bulging of the ribs, and a prominent swelling in the epigastrium or under the right ribs. The swelling may be tense, rounded smooth, and may be fluctuating if the abscess be superficial. There is no hydatid fremitus. Very often if the abscess be deep seated, there will be no bulging, no fluctuation, and even no enlargement of the liver. In such cases pain and tenderness are increased, but they are dull and heavy ; rarely acute. When the abscess approaches

Symptoms of  
acute hepatic  
titis.

Suppuration.



the surface the fever and acute pain again manifest themselves. Very often there may be a constant pain in the right shoulder throughout the whole course. Other symptoms, as jaundice, ascites, enlargement of superficial veins, and enlargement of spleen due to some mechanical pressure upon portal veins or on hepatic ducts are generally absent. The existence of hectic fever, rigors, night sweats, and frequent pulse are characteristic of suppuration; but they are less marked than in pyæmic abscesses. The tongue is coated, and often covered with aphthæ. Loss of appetite, vomiting, diarrhœa, or dysentery are common. In sthenic cases febrile disturbance is high, and the secretions are scanty. In asthenic cases the fever assumes a typhoid character. When the inflammation is confined to the upper surface or substance of the right lobe there is pain in the right shoulder and scapula. There is fulness in the hepatic region, the liver is enlarged, and occasionally slight jaundice, there is more or less dyspnœa, cough, vomiting, and even hiccough. In hepatic abscess pain is peculiarly characteristic. When sharp and lancinating it shows inflammation of the serous coverings, but when dull the parenchyma is only affected. Where the abscess is confined to the convex or upper surface of the liver, the chest symptoms, as cough and dyspnœa, will predominate; when it affects the lower surface, the derangements of the stomach will be most marked, as vomiting, hiccough, &c. As the case progresses the patient gets more and more emaciated, and prostration, diarrhœa, or dysentery sets in.

Pain.

Complications.

Very often the symptoms of hepatic abscess are vague and misleading. In many cases the abscess supervenes in the course of dysentery or pyæmia, and the symptoms of suppuration are masked by the pyæmic and dysenteric symptoms. Very often hydatid tumours in the liver complicate suppuration. In hepatic abscess there is local pain

and tenderness, no hydatid fremitus, and a tumour in the hepatic region; there is also displacement of the neighbouring organs, and derangement of their functions and various other general constitutional symptoms.

*Symptoms in detail.*—1. Pain varies with the extent and intensity of the abscess, or it may be entirely absent. Is most severe in superficial abscesses.

Symptoms in detail.  
Pain.

2. Condition of the tumour depends upon the number, size, and the seat of abscess. If large and deeply seated into the substance of the liver it may escape unnoticed. If seated anteriorly it forms a rounded mass, and is distinctly felt as a fluctuating tumour.

Condition of tumour.

3. The diaphragm is displaced, its action is interfered with. The respirations are thoracic, shallow, and painful, and there is cough and hiccough. The stomach is disordered, and there is nausea, vomiting, and dyspepsia.

Respiration.

4. The fever may be severe and temperature elevated either at the commencement or during the course, or at a later stage. There may be morning remissions and evening exacerbations. The temperature seldom goes above 102° or 103°. It is often attended with chills or severe rigors, or there may be no fever at all throughout the course. The fever if present soon assumes a hectic character, and is attended with profuse sweats at night.

Fever.

*Terminations of hepatic abscess.*—It is always dangerous and often proves fatal. Death is due to impairment of nutrition, to extreme debility, to persistent high temperature, to retention of pus into the blood leading to pyæmia, or to low symptoms with nervous symptoms superadded. The abscess may undergo a complete cure, and the liquor puris may become reabsorbed. Or the pus corpuscles become further degenerated, and the abscess either bursts into the peritoneum giving rise to fatal peritonitis or opens into the lungs, and recovery commonly occurs. Rarely, however, abscess terminates into mortification or gangrene.

Terminations of hepatic abscess.

Treatment.

*Treatment.*—The strength should be supported. If there be torpor of the liver it should be excited, but, if the liver be active, the circulation should be moderated, and its action reduced. Cooling drinks, alkalies and febrifuges with salines and laxatives may be given. Milk and beef tea are recommended. Locally use fomentations, mustard plasters, but if fever be severe, pain great, and the patient sthenic, leeches will do good, or cupping may be used with advantage. The drugs recommended are iodide of potassium, hydrochlorate of ammonia, taraxacum, and nitro-muriatic acid. Pain may be relieved by sedatives. Sometimes early leeches to the hypochondrium will stop suppuration. When the abscess is suspected all active measures are to be strictly avoided; a good nourishing diet, tonics and ammonia, with cinchona, will be required. In cases where abscess has fairly formed, exploratory puncture by means of an aspirator needle is an extremely useful and a safe procedure. Do not allow the abscess to take its own course, for in this procedure there is greater risk of disorganisation, and for the abscess to make its way in different parts or channels; further, if the abscess be allowed to go on untouched, it will daily increase in size, and even the ribs will be eroded. About twenty years ago, when the hepatic abscess was allowed to take its own course, and erosion of the ribs was the common result, such patients often died from exhaustion or from sudden collapse, or from the abscess bursting itself in some of the internal important organs.

Cirrhosis.

## CIRRHOSIS OF THE LIVER.

The true contractions of the liver occur in simple atrophy, acute or yellow atrophy, and in chronic atrophy. The chronic atrophy is otherwise known as gin-drinker's liver, or cirrhosis. The contraction may be due to lung or heart-

disease, or to inflammation of its capsule. Like enlargement, true contraction may be produced during health by distension of the bowels or of the stomach, or to one or other of these organs intervening between the liver and the sternal walls, thus diminishing the natural area of hepatic dulness.

*Atrophy due to lung and heart disease.*—In this condition the liver is at first enlarged, and subsequently contracted. The enlargement may be due to an increased flow of blood to the liver, owing to an obstructed circulation in the lungs or the heart. The liver is firm and granular, and marked with depressions in the centre of the lobules. Atrophy due to lung or heart disease

*Pathology.*—Atrophy is said to be due to distension of the portal capillary veins of the liver pressing on the secreting cells. The hepatic cells thus disappear, the central portions of the lobules become depressed, their margins being surrounded by distended portal veins. In advanced cases distension extends to the large branches of the hepatic veins, and they also become distended, and thus lead to further obstruction into the minute branches of the portal veins. Pathology

In such cases there may be previous history of heart or lung disease. There is also dyspnoea and ascites, with œdema of the legs.

*Atrophy due to simple induration or frequent attacks of inflammation of the capsule.*—In these cases the capsule becomes thick and firmly adherent to the surrounding parts. Its fibres extend into the interior of the lobules, and lead to their obliteration. The disease is most commonly due to syphilis. In such cases gummata are also found on post mortem in the interior of the liver. Atrophy due to inflammation of capsule.

*Cirrhosis* of the liver literally means yellowish or yellow colour, the colour may be due to a large amount of yellow pigment found in the secreting cells. The disease is characterised by a slow destruction of hepatic cells and an Cirrhosis



increase of the connective fibrous tissue. The disease is generally chronic. It extends over several years, and has an insidious commencement. In it the liver is probably increased in size at first, but latterly it acquires a diminished bulk.

Cirrhosis is a chronic interstitial inflammation or hypertrophy of the fibrous covering of the liver and of the connective tissue (Glisson's capsule) which surrounds the vessels within the organ. The inflammation extends into the minutest portal canals, leads to proliferation of cells between the lobules, and to the exudation of lymph, which readily organises and causes pressure upon and obliteration of the vessels, thus diminishing the nutrition of the secreting cells and cause their atrophy.

Causes.

*Causes.*—Is common between thirty-five and sixty. In males more than in females, and in persons who are long in the habit of drinking undiluted spirits on an empty stomach. Hence it is called *gin-drinker's liver*. A hot climate and abuse of hot spices also gives rise to it.

Morbid appearances.

*Morbid appearances.*—In the *first stage* the liver is enlarged, increased in thickness, and its peritoneal covering clouded. Externally some slight elevations are noticed. The surface is smooth and even. It is abnormally firm and dense. On section the parenchyma is composed of firm bands, the remains of vessels and bile-ducts, and of connective tissue striæ with spindle-shaped cells. In the *second stage* the liver is extremely small and pale, the surface presenting numerous projections, and hence called *lob-nailed liver*. The edges are thin, with obtusely indurated border, and there is no liver tissue. *On section.*—The cut surface is hard, tough, and leathery, the left lobe shrivelled into a mere membranous appendage; the capsule where it joins the connective tissue is thick and inseparable, and is drawn in. When the capsule is torn away the surface of the liver appears covered with small elevations. In some

cases all the lobules are more or less involved in the change, and they are often lost in the growth. The liver at first looks large and irregular on the surface, but in advanced cases appears contracted, and presents a greyish translucent aspect, and is studded with degenerated yellow granules or fat. The cells of the liver are flattened, atrophied, and degenerated, are yellowish from the accumulation of bile pigments, and resemble beeswax; hence such a liver has been called *cirrhosis*. There is also destruction of minute branches of the portal veins.

*Pathology.*—Cirrhosis begins with inflammation of the portal veins. The Glisson's capsule surrounding these portal capillaries both in the periphery of the lobules and between the lobules becomes thick by a deposit upon it of an embryonic tissue. This deposit gradually encroaches upon the lobules, and after a time becomes converted into a fibroid tissue. The connective tissue thus formed compresses upon the branches of the portal veins, upon the portal duct, and upon the hepatic arteries, and it also surrounds them. The condition of the liver thus resulting from the existence of adventitious growth is to diminish itself into a smaller area, thus constituting a condition known as *yellow atrophy*. Pathology.

*Symptoms.*—Are those which precede obstruction of the portal veins, and those which follow. Those which precede—For a long time there may be no manifest symptoms to attract attention. In the *first stage* in many cases there may be indication of ill-health, with progressive loss of strength and emaciation, and there may be some evidence of a previous similar disease in the kidneys. In some cases the habit of the patient or history of alcohol may attract attention to cirrhosis. In a vast majority of cases in the early stage the symptoms are those of congestion of the liver, gastro-enteric catarrh, and slight fever. There is alcoholic dyspepsia, sickness, and retching in the morning, loathing for solid food and desire Symptoms.

First stage.

for stimulants, and there is pain or tenderness in the liver. On examination the liver is found to be enlarged. In the *second stage* the symptoms depend almost entirely on obstruction of the portal circulation. The mechanical compression of the portal veins causes congestion of those organs which send their blood to the liver. The compression of the hepatic-ducts causes absorption of bile and jaundice. There is chronic gastric catarrh, general cachectic appearance, and gastric or intestinal hæmorrhage; there may also be hæmorrhoids. The spleen is enlarged. Ascites is present, and may be due to engorgement of veins of the peritoneum. There is also œdema of the legs and scrotum, and of the abdominal walls. Very often ascites may be absent owing to the abnormal distribution of the veins. There is rarely much biliary obstruction, hence the patients have a dirty yellow, but not intensely jaundiced look. The urine is scanty, acid, and dark coloured, and contains bile and other colouring matter. Patients are feeble and emaciated. Sometimes coma, drowsiness, delirium, and even convulsions occur. In later stages as the effused growth greatly obstructs the flow of blood through the portal vessels *hobnailed* liver may be felt externally, and dropsical effusions and ascites are present, and they gradually increase. There may be occasionally jaundice. Sometimes rupture of the distended portal vessels may give rise to hæmorrhages into the alimentary canal, as occurs in congestion or inflammation of the liver. Cirrhosis is slow in progress.

Diagnosis.

*Diagnosis.*—From fatty and waxy liver, and from cancer. In cancer the organ is progressively enlarging, there is little dropsy, and slight enlargement of the superficial veins of the abdomen. The spleen is enlarged. *Fatty liver.*—Liver is enlarged, surface and margin smooth. It occurs in the debilitated; there is slight jaundice, and no other hepatic symptoms. *Waxy liver.*—The liver is considerably

enlarged, is of soft consistence, there is enlargement of spleen, albuminuria present, but dropsy is rare.

In cirrhosis the patient dies from exhaustion attended with coma, or from complications, as œdema or inflammation of the lungs. The progress is slow. The affection is met with in adults between thirty-five and sixty, and there may be history of drinking raw spirits and strong wines on empty stomach.

*Treatment.*—When the case is seen very early the habit of constantly taking spirits should be checked. A strict abstinence from spirits, coffee, curry, and high-spiced dishes is necessary. Check any complications that may arise. If there be suspicion of syphilis treat it accordingly. Diet should be simple and nutritious, and without spices. Exercise should be enjoined. Where the disease is far advanced and ascites has set in, attend to the state of the digestive organs, palliate the dropsy by diuretics, purgatives, and by tonics. If there be any hæmorrhage present, astringents will most likely check it. If dropsy be excessive the fluid may be removed by tapping. Treatment.

## YELLOW ATROPHY OF THE LIVER.

### (MALIGNANT JAUNDICE).

Malignant  
jaundice

*Yellow atrophy* is a diffuse parenchymatous inflammation of the liver. It is also called hæmorrhagic or malignant jaundice. The disease is rare. Is characterised by a very rapid progress, by coffee-ground vomit, delirium, the existence of jaundice, and cerebral symptoms. The secretion of bile is more or less completely suspended, and there is rapid and complete destruction of hepatic cells which are converted into granular matter and oil globules. The liver is considerably diminished in size. Is soft, yellow, and pulpy, and without any trace of lobules.

*Causes.*—The disease is rare. Is more common in Causes.



women than in men, and in women chiefly during pregnancy, when it very often causes abortion. Anxiety, sudden alarm, fits of passion, syphilis, excesses of any kind, intemperance, poisoned state of the blood, as malaria, typhus fever, or long-continued use of phosphorus, mercury, or arsenic all lead to it.

Pathology.

*Pathology.*—Atrophy is a result of a peculiar form of hepatitis. It is probably a parenchymatous inflammation, in which there is little or no free exudation, with obstruction to vessels at the periphery of the lobules. The hepatic cells undergo molecular and fatty degeneration. The symptoms of the disease are secondary to the liver disorder. Some assert this affection as a consequence of some poison in the blood, due to the absorption of some noxious substance, or of some poison similar to that of pyæmia, or of infectious diseases; and that some of the symptoms belong to the primary disease, and others arise from disorders of the liver; and they find nothing in the clinical history to indicate its inflammatory origin, for very often the existing symptoms of jaundice are found in cases of occlusion of ducts. But it must be remembered that the destruction of the hepatic cells, with suppression of bile, is enough to induce all the changes observed in this affection without the existence of any blood poison.

Morbid  
appearances.

*Morbid appearances.*—The liver may be of natural size, usually it is diminished from one half or one third of its bulk. Its surface is shrunken and flabby. The Glisson's capsule is in folds, puckered, and opaque, and the gland itself is much sunken and lies against the posterior wall of the abdomen. It is soft and easily friable. The cut surface is dull yellow all over, the outlines of lobules and cells are destroyed, and the blood-vessels appear empty. The gall-bladder and bile-ducts are empty or only contain colorless mucus. Under the microscope the atrophied liver is seen to be a mass of fatty degeneration. The hepatic cells are

replaced by granular *débris*, oil globules, and bile pigment matters. Leucine and tyrosine may be seen in hepatic veins and in the hepatic substance. The spleen is enlarged and congested; there is extravasation of blood beneath the surface of the peritoneum pleura, or within the stomach and intestines; the kidneys are also degenerated; and they present pigment and fatty deposits in the epithelial cells.

*Symptoms.*—The disease often sets in with catarrh of the stomach and bowels, and with slight fever. The tongue is furred. There may be nausea and complete loss of appetite. After a few days or weeks jaundice appears. In some cases jaundice is the first symptom to attract attention. The jaundice is generally not severe, and may be often confined to the conjunctivæ, or to the face and limbs. The liver is small in size, but there is no pain, and the spleen is enlarged; there is no dyspnœa; there are petechiæ or ecchymotic spots over the body, often vomiting of food, mixed with mucus, or the vomit is coffee-ground like from its admixture with altered blood. There is intense headache, great restlessness, irritability of temper, wandering and noisy or low muttering, delirium, tremulousness of the limbs and convulsions. After a time the delirium or convulsions pass into deep stupor. There is coma with dilated pupils and stertor. The pulse is slow at first, but with the cerebral excitement it becomes extremely frequent and also very feeble. The temperature rises. The tongue is coated at first, but soon becomes dry and brown. Typhoid symptoms soon set in. Death occurs on the second or the fifth day. Often there is obstinate constipation, with pale, clay-coloured stools, which subsequently become black; the urine may be natural, or there may be retention, or its secretion may become scanty and high coloured. The reaction is acid and its specific gravity high; it is slightly albuminous and loaded with bile

Symptoms.

Jaundice.

Vomiting.

Delirium.

pigments. The solids, as urea, phosphates of lime, and uric acid, are diminished and are replaced by leucine and tyrosine which deposit as greenish-yellow sediment.

Under the  
microscope.

*Under the microscope.*—The urine presents needle-shaped crystals or finely marked laminæ of tyrosine and leucine.

The patient at first complains of pain in the hypochondrium, often of pain in the right shoulder. The pain is peculiar, it may be paroxysmal, and often increased by pressure over a limited part. The abdomen is puffed, and is slightly tender. The natural hepatic dulness is considerably diminished, while that of the spleen is much increased. In unfavorable cases the jaundice becomes more marked, and there are hæmorrhages from the alimentary canal, and even from the bronchi, or petechiæ, or mere extravasations beneath the skin are present.

Duration.

*Duration.*—The disease, after it is fully developed, seldom lasts beyond a day or two, or at most a week. Recovery is very rare. Death occurs from coma; it is preceded by gastric catarrh, bilious vomiting, jaundice, low typhoid symptoms, as muttering delirium, and albuminuria.

Treatment.

*Treatment.*—Free purgation and to promote the action of the skin by vapour baths, diuretics, are recommended. Hæmorrhages must be treated as they arise. Vomiting should be checked, excitement soothed by sedatives, and stupor and coma, treated by counter-irritants to the neck and by stimulants.

Simple  
atrophy.

### SIMPLE ATROPHY OF THE LIVER.

In this disease the functions of the liver are suspended, the capillary circulation through the gland is arrested, and the nutrition of the liver is lessened. Liver is diminished in size to one half its normal bulk, without any alterations of structure.

*Causes.*—Constant pressure over the liver by tight lacing; pleuritic effusion, hypertrophy of the heart, chronic peritonitis, or distended colon are causes which tend to diminish the size and functional activity of the liver. Old age, inanition, or starvation as in cancer, or pyloric stricture often leads to it. Causes.

*Morbid appearances.*—The liver is small, flabby, and uneven on its surface, its capsule wrinkled, the hepatic cells within it shrivelled up and diminished in size, they are pale in colour, and loaded with oil or bile pigments. Atrophy varies with the extent of obstruction in the large blood-vessels and in biliary ducts. Morbid appearances.

*Symptoms.*—Relate to defective action of the hepatic cells. Symptoms.  
The liver is small in size, there is no pain; dropsy is present. Spleen is not enlarged, and there is no jaundice. In well established cases, at first, there is disturbance of the digestive functions; the tongue is furred, there is great thirst and loss of appetite, attended with flatulence, diarrhoea and pale-coloured stools. These are soon followed by a dry and sallow skin, emaciation, and diminution in the size of the liver. As the case progresses emaciation increases, appetite is altogether lost, and dropsy sets in. Death takes place from exhaustion.

*Treatment.*—The disease, if early recognised, can be cured on removal of the cause. If due to cancer or old age, or to organic mischief, it is usually fatal. The digestion must be improved by tonics. The diet should be light and nourishing, warm clothing worn next the skin. Dropsy may be treated on general principles. Treatment.

*Syphilitic hepatitis.*—The liver is of all the internal organs one which is most often affected by syphilis. It is an affection most common in congenital cases of syphilis. Syphilitic hepatitis.

*Anatomical appearances.*—The liver is uniformly enlarged. There are cheesy spots enclosed in dense hepatic tissue, with striæ extending from them in various directions. Anatomical appearances.



The surface of the liver presents furrows, which look apparently tabulated owing to the parenchyma of the liver having been destroyed and replaced by embryonic tissue. If hepatitis is diffuse, extensive portions of the liver are transformed into hard dense tissue.

**Symptoms.**     *Symptoms.*—The disease often cannot be recognised during life. The symptoms are generally those of cirrhosis of the liver, or of obstructive hepatic disease.

**Treatment.**     *Treatment.*—If early recognised iodide of potassium often cures the disease.

Fatty liver.

### FATTY LIVER.

*Fatty liver* is a painless enlargement of the liver. It is an adjunct to other disorders, but not a disease in itself. In this degeneration the hepatic cells are at first diminished in size, and gorged with fat globules and granular matter. Their nuclei and nucleoli are subsequently destroyed. The process is, in fact, one of fatty infiltration.

**Causes.**     *Causes.*—Fatty liver may exist in health. It is common in persons who have high living, lead a sedentary life, and who eat plenty of fatty matter. It is a common accompaniment of morbid state of the system, as chronic alcoholism, or heart disease, of malignancy, pulmonary tuberculosis and other wasting diseases. It is often associated with disordered liver, as occurs in the early stage of cirrhosis, in lardaceous and in other degenerations. It is also met with in liver diseases, due to diseases of the heart and lungs. Excess of alcohol conduces greatly to it.

**Morbid appearances.**     *Morbid appearances.*—In the early stage there is a deposit of fat in the hepatic cells. At a later period the quantity of fat is increased, and the oil globules cluster round the nuclei in the cells, and the cells are also distended with fat. The deposit takes place at first in the periphery of the lobules. The liver is uniformly

enlarged, and also increased in weight. Its specific gravity is also increased. Its margins are thick and rounded, the surface being quite smooth. If the abdominal walls are thin, the liver feels soft and doughy, and can easily be pushed aside. It has lost its yellow colour. On section the cut surface presents a reticulated appearance, the tissue is soft, opaque, has a doughy inelastic feel, pits on pressure, and readily breaks under the fingers. Very little blood escapes from the cut surface; the tissue is greasy, and fat is detected by its presence on a knife, or fingers, or blotting-paper, or by ether. Where the deposit is due to cirrhosis the fatty zone occupies the hepatic substance. In cases due to chronic lung or heart disease the deposit of fat is at the periphery of the lobules, the inner portion is anæmic, and the most central part is deeply congested, giving the liver the appearance of a *nutmeg*. In phthisis and other wasting diseases the liver is pretty generally involved, and is therefore soft, pale looking, and increased in size.

Section

Under the microscope olein, margarine, and cholesterine, are found in the secreting cells, and the cells are more or less destroyed.

*Symptoms.*—Some are due to deranged functions of the liver, and others are associated with fatty changes in other parts. The patient feels general want of tone; there is pallor and greasy or velvety condition of the skin, and has inability to work. In the early stage when the hepatic cells are not much loaded with fat, there is no pain, no enlargement, no jaundice, and no dropsy. Enlargement of the spleen is rare. The skin has a bloodless, semitransparent appearance; to the touch it is smooth, loose, and flabby. In more advanced cases the cells are much loaded with fat, and the symptoms of structural changes in the liver are superadded. These are those due to hepatic congestion and to obstructive jaundice. We find derangement of the stomach and bowels, obstruction to the portal circu-

Symptoms.

lation, and signs of fatty changes in other organs and tissues, such as the heart and kidneys; thus, we may find a quick and feeble pulse, extremely low impulse of the heart, syncope, a feeling of exhaustion, and hurried breathing on very slight exertion. Where the kidney is also degenerated, the urine contains albumen and fatty casts. There is general anasarca and pallid surface of the body.

Physical examination.

*Physical examination.*—Reveals moderate and slow enlargement of the liver, which during life may cause fulness, weight, and uneasiness in the side.

Treatment.

*Treatment.*—Free the hepatic cells of their excess of fat. If due to degenerations in other parts treat the primary disorder. Above all regulate the diet. If due to alcohol avoid spirits and hydrocarbonaceous food, and attend to hygiene. The condition of the stomach and bowels may be regulated by free exercise in the open air. As the complaint is generally secondary to phthisis or syphilis, it must be treated by cod-liver oil and iodide of potassium.

Amyloid degeneration.

#### AMYLOID DEGENERATION OF THE LIVER.

*Albuminoid, lardaceous, or waxy liver.*—In this affection the liver undergoes greater enlargement than from any other disease, except cancer. It may either exist alone or in connection with fatty liver. In this disorder the function of the liver are altogether abolished.

Causes.

*Causes.*—It is never primary, and is generally associated with lardaceous degeneration in other parts. Thus, it is a factor in chronic phthisis, in syphilis, and in prolonged suppurations.

Morbid appearances.

*Morbid appearances.*—The deposit at first appears within the hepatic lobules, midway between the centre and the periphery, and affects the walls of the arteries and the hepatic cells. The disease then extends to the centre, and

also to the periphery of the lobules. The arteries become thick. The cells enlarge and lose their normal structure. They are of an irregular form, and their nuclei are considerably reduced in size. The size and weight of the liver, as well as its specific gravity are greatly increased. On section the surface is usually pale, glistening, quite homogeneous, presents only faint traces of lobules, and resembles in appearance bee's wax.

*Physical examination.*—The liver is slowly and uniformly increased in size, and appears as a visible prominent tumour. It fills a large portion of the abdominal cavity. Its form is not altered. Its dulness is increased upwards and downwards, and is more in front than behind. The abdomen is enlarged, and there is bulging in the right hypochondrium and in the epigastrium, but no bulging outwards of the ribs. On palpation it is dense, firm, and resisting, the outer surface smooth, the lower border rounded and regular.

Physical  
examination.

*Symptoms.*—The growth is slow and imperceptible, extending over many years. There are constitutional symptoms with œdema, and frequent evidences of a similar disease in the kidneys, spleen, and stomach. It occurs most commonly in phthisis, and in subjects of constitutional syphilis; the infiltration is known by the diminished secretion of bile, and by its interference with the general circulation. The patient looks cachectic. The disorder is after some time followed by extreme emaciation, exhaustion, and death. There is no tendency to obstruct the portal circulation, and hence there is no ascites, and no enlargement of the superficial veins of the abdomen. Jaundice is also rare, and may occur from pressure on bile-ducts of the enlarged lymphatic glands, or from catarrh of the ducts which is generally associated with it. There is no pain. The spleen and kidneys, and sometimes the lymphatic glands are enlarged, and the

Symptoms.



gastro-intestinal mucous membranes are all more or less affected. Urine seldom contains bile-pigment. Vomiting and diarrhœa are common.

Treatment.

*Treatment.*—Remove the cause. The state of general health must be improved, and attempts should be made to prevent the occurrence of complications. The diet ought to be nutritious and such as can easily be digested. Wines and spirits are useful. Change of air to an equable climate is serviceable. Tonics, iron, and cod-liver oil are useful aids. Some recommend hydrochlorate or carbonate of ammonia. Where syphilis exists any preparation of iodine does good.

Pigment liver.

*The pigment liver* is due to the deposit of pigment in the capillary net-work of the portal and hepatic veins, and into the minutest branches of the hepatic artery. As a consequence the hepatic circulation becomes impeded. The liver is first congested, and subsequently atrophied. The pigment matter through the liver is carried to the lungs and brain. In the brain it accumulates into the capillaries and thus leads to serious brain mischief. It is common in persons suffering from remittent or other malarious fevers, and therefore the poison should be as quickly removed as possible; for when once the disease is established it would be too late to hope for a cure.

Symptoms.

*Symptoms.*—The skin is sallow or of a dull yellow hue. There is enlargement of the spleen, anasarca, albuminuria, diarrhœa, or intestinal hæmorrhages, delirium or tendency to stupor, but little or no jaundice.

Hydatids.

### HYDATIDS OF THE LIVER.

Acephalocyst (*Ecchinococcus Hominis*) are parasitic affections known as hydatids of the liver. Hydatids literally signify vesicles. The seats of these tumours are chiefly in the liver; but they may also be found in the spleen, muscles of the heart, brain, kidneys, and lungs.

*Pathology.*—A kind of tapeworm known as *Tænia echinococcus* inhabits intestines of dogs and wolves. Its ova are evacuated in their excreta, and becoming mixed with water or food, are introduced into the stomach of a human being. Here they penetrate the walls of the stomach, and then migrating settle into the liver, and there produce *ecchinococci*, and there become enclosed in cysts. The larval form of this worm is known as *hydatid*. In its early condition it is a small globular cyst with laminated walls and granular contents. At a later stage the cysts increase in size, their walls become thick, and the contents fluid. The walls are formed of an outer laminated portion and inner delicate cells containing oval bodies. In some cases the *hydatids* only increase in size; in others they undergo further change and form other cysts in the substance of its walls or towards the outer or the inner aspect. These secondary cysts present characters of a parent cyst. They are devoid of an outer laminated wall, and their contents form *scolex* (heads) or *echinococci*. These small cysts or bladders are called *acephalocysts*, meaning cysts without a head. They are semi-transparent, and gelatinous, have a laminated appearance, are embedded in an outward coating of firm, fibrous, vascular capsule, which is also studded with cells, and the whole constituting a parent sac, or a vesicle.

The fluid within the mother sac or cyst is colourless and watery, of a specific gravity 1008 to 1012, generally alkaline, occasionally acid, and contains excess of chloride of sodium. There is no albumen, no fibrin. Floating in this fluid are often found daughter cysts, similar in structure to the mother cyst. These secondary cysts often so completely fill the cavity as to show little or no fluid within the cyst. In some cases these daughter cysts again contain within them other or their granddaughter cysts, which again carry within them a fourth generation.

When an acephalocyst is opened its lining membrane is seen covered with numerous opaque spots or granules, each of which consists of numerous *tænia echinococci*. *Echinococcus* is a round body about one tenth of a line in length, it has a depression at one extremity and an orifice at the other; at the depressed extremity it is attached to the parent cyst-wall. At the end of the canal lies a cylinder of hooklets surrounding the head, and on the sides are four suckers, which are movable and close to the head.

*Hydatids.* Hydatid tumour may be one or more. It may be small and in one spot, or of an enormous size, so as to completely fill the abdomen. It is generally of a round shape. May occupy any portion of the liver, but chiefly the right lobe. When large it presses upon the neighbouring parts, and interferes with their proper functions. They originate in the hepatic substance, which is displaced as they develop, and which often becomes indurated and forms a fibrous capsule covering them. Hydatids are not uniform in their direction; they generally follow upwards, downwards, or lateral direction, and, thus, when supplicated, they burst either into the peritoneum, intestine, stomach, or lung. They may burst externally or internally. They burst more commonly into the pleura or lung, and fatal pleurisy results. When they open into the peritoneum fatal peritonitis soon follows. May open into one of the bile-ducts. The entrance of bile into the cyst kills the parasites, and thus constitutes the beginning of a spontaneous cure. When the tumour grows rapidly it generally suppurates, but when its progress is slow the parent cyst undergoes calcification, thus preventing further growth. There is death of the parasite, and ultimately a spontaneous cure is affected. In cases of recovery the outer covering of the cyst becomes firm and calcified, and thus impedes its further growth; often the hydatids which may remain within the cyst compress each other, shrivel and dry

*Directions.*

up, and even die. The fluid also becomes thick, and a putty-like *débris* with hooklets of the worms merely remain behind. When the tumour dries up it often leaves a cicatrix-like depression.

In multilocular hydatid cysts a distinct tumour as large as a child's head is found in the liver. It consists of a fatty stroma, of cells of various sizes filled with a gelatinous substance, and fragments of hydatids with hooklets and calcareous particles. As a rule this growth is extremely slow, often extending over many years.

*Symptoms.*—The commencement is insidious. There is only a sensation of weight in the liver felt by the patient for a long time. There may be slight pain due to their pressure on neighbouring parts, or from supervention of inflammation. The attention is often drawn to it by a simple enlargement in the epigastrium or in the right hypochondrium. There is no disturbance of the functions of the liver or of the constitution. In rare cases enlargement of the liver, jaundice, and signs of hepatic congestion are noticed. Ascites, œdema of the feet, and enlargement of superficial veins of the abdomen when present are chiefly due to pressure of the tumour on the trunk of the portal vein, or inferior vena cava, or iliac veins. It rarely interferes with the functions of the kidneys, and hence urine is not altered. Symptoms.

*Physical examination.*—The growth is slow and imperceptible. If the tumour be large it can easily be felt as a round or a fluctuating mass, and the abdomen is also enlarged. The enlargement is not uniform, does not follow only one direction, and thus the liver is much altered in shape, and is lobulated and irregular. The tumour is neither dense nor doughy, its surface is smooth, elastic, and sometimes fluctuating. Very often when the tumour is near to the surface it may be recognised by a hydatid thrill or vibration. The thrill is a kind of percussion characterised by a peculiar trembling sensation being Physical examination.



imparted to the three fingers of the left hand when they are laid flat on the tumour, and the back of the left middle finger is struck abruptly with the point of the middle finger of the right hand. It reminds us of a peculiar tremor felt during a railway travel over a suspended bridge.

Aspirator.

Under an aspirator the fluid oozes out which under the microscope presents the characteristic traces of echinococci.

The multilocular tumour is generally nodulated, hard, and tender; has a tendency to inflame and suppurate, it runs a rapid course, and is attended with jaundice, ascites, and enlargement of the spleen.

Diagnosis.

*Diagnosis.*—May be mistaken for an hepatic abscess, distended gall-bladder, cancer, cyst of the kidney, and ovarian cyst. The absence of acute symptoms, the history

Hepatic abscess.

of latent growth, exclude hepatic *abscess*. The shape and position of the tumour, the history of recurrence of biliary colic, and presence of jaundice, point to obstructed and

Distended gall-bladder.

*distended gall-bladder*. In *cancer* of the liver the surface is irregular, the tumour hard and tender to manipulation; there is absence of fluctuation and of elasticity, and there

Renal cyst.

is marked cancerous cachexia. From *renal cyst*.—The renal cyst being placed in the loins there is colon in front of it and is not affected by deep inspirations. On exploring the cyst the contents do not contain parasite or any fragments of hydatid, but contain abundance of chlorides, and salts, and albumen.

Phantom tumour.

In a *phantom tumour* there is no fluctuation, no hydatid vibration, and the tumour

Ovarian cyst

disappears under chloroform. *Ovarian cyst*: the growth is from below upwards. There is no space between it and the brim of the pelvis, but a hollow can be felt between its upper surface and the diaphragm. In hydatids the enlargement is most above the umbilicus than below it. The fluid in hydatids of the liver is almost characteristic. It is alkaline, of specific gravity of 1009. There is no albumen, no urea, but contains chlorides.

*Terminations.*—The tumour may destroy life in one of several ways ; it may *burst internally*, and may cause sudden death. Where the disease extends over years death may result from *exhaustion* or by marasmus. Its pressure on internal and important organs leads to interference with their functions. Thus, pressure on intestines and stomach interferes with assimilation, and leads to *emaciation* and *cachexia* ; on the veins of the abdomen causes *ascites*. Very often secondary hydatids may form in the lungs, and cause death by pneumonia, or may form in the mesentery. Terminations

*Treatment.*—Common salt and iodide of potassium, said to destroy worms, may be tried. The strength should be supported. If the tumour has attained a very large size, and is adherent to the abdominal parietes, or has undergone inflammation or suppuration, surgical aid should be resorted to, and fluid slowly evacuated by an aspirator, and the part subsequently bandaged properly. In cases of suppuration a free incision should be made when practicable. Treatment.

## MORBID GROWTHS.

Morbid  
growths.

*Tubercles* are common in the liver, and are associated with tubercles in other organs. Generally they resemble in colour and size to hepatic lobules, and are, therefore, not easily detected.

*Syphilis* affects the liver, and in this organ gummata are found which have often undergone degeneration. These growths are of various sizes, and are rounded or irregular in form. May be solitary or grouped together. The disease is generally chronic in its course, and leads to contractions of the surrounding hepatic tissues. The growths may occupy any part of the liver, are common on the convex surface and in parts most exposed to injury. Syphilis.

They have a tendency to give rise to interstitial inflammation. It is thus that cirrhosis is common in congenital or hereditary syphilis.

*Symptoms.*—Are the same as of cirrhosis of the liver, viz. enlargement of the liver, jaundice, ascites, and hæmorrhage from the bowels. The liver is irregular in form. The history of syphilis will soon aid the diagnosis. Such cases are best treated by iodide of potassium.

*Non-malignant* growths are often met with in the liver. These are known as simple cysts, and are quite different morbid formations from hydatid cysts. These simple cysts vary in number and size; the largest are as big as a good-sized mango. Their chief seat is the middle part of the anterior border of the liver. They consist of a very thin wall, lined by epithelium, and contain clear fluid. They do not give rise to any hepatic derangements, and are frequent companions to cystic formations in the kidney and spleen.

Malignant  
diseases.

*Malignant diseases.*—As a primary affection they are rare. *Carcinoma.*—Out of five cases of cancer one is generally in the liver. Are often secondary, and occur after the extirpation of the peripheral tumours.

Those most frequently met with are the medullary or soft, and scirrhus cancers. The melanotic and the colloid are very rare. They appear as isolated masses. Sarcomatous growths also occur as spindle-shaped sarcoma and myxoma. The disorder may be primary or secondary to cancer of the breast, kidneys, or stomach. It is often seen among females, and often after the age of fifty years.

Morbid  
anatomy.  
Isolated  
nodules.

*Morbid anatomy.*—The disease appears in two forms, as isolated nodules and as an infiltration. Medullary appears in the form of a number of distinct, well-defined, hard, spherical nodules implanted in different parts of the liver; in some cases these growths spread by infiltrating its healthy structure. When they appear as separate nodules

are globular and vary in size from a pea to an orange. Those seated towards the surface of the liver and immediately adjacent to the capsule assume a characteristic cupped appearance, owing to the presence of a swelled peripheral ring with a central concave depression formed by their central portions having undergone liquefaction. They are highly vascular on their surface, and the liver structures surrounding them are also injected. They grow by invading the healthy tissues. They also invade the portal vein and its branches, the lymphatic glands, vessels, and bile-ducts. They have a tendency to active growths at their margins, while their central portion undergoes degeneration and necrosis, thus causing a characteristic cupped appearance. The degeneration will be caseous or even calcareous. Often hæmorrhages occur. Occasionally central part liquefies and forms cysts. On section the cancer appears of a yellowish-white colour, more or less dotted with red streaks, and is at times extremely vascular. The tumours are flattened where they touch the peritoneum. The size of the liver is increased. The liver is much enlarged, very heavy, often weighs several pounds, and is extremely irregular. The enlargement is progressive. It is irregular, owing to the existence of nodules of cancer projecting from the surface of the liver. On palpation the nodules can be easily felt. Where the cancer infiltrates the liver tissue, the nodules are not found, although the liver is enlarged, and its outline is uniform. The nodules are hard and resisting, and often present a depression in the centre. The liver is tender and painful, the pain radiating in different directions, is often paroxysmal and lancinating. The liver cells are compressed and destroyed, its vessels and ducts also compressed and obliterated. The hepatic circulation is obstructed; the functions of the liver are altered; the disorder also affects the neighbouring tissues and lymphatic glands. The



Infiltration.	hepatic cells nearer the tumour undergo fatty degeneration. Where the cancer is soft the growth is extremely rapid, the vessels soon give way, and hæmorrhage occurs. The diffuse form, or where cancer infiltrates the structure of the liver, is generally rare. In this affection the liver is uniformly enlarged. Its normal shape is retained. On section the liver is spotty and is uniformly infiltrated.
Melanotic.	<i>Melanotic</i> form of sarcoma occurs and infiltrates the organ. The liver is enlarged; its structure is intermingled with melanotic spots, and looks like that of granite. Spindle-shaped sarcoma and <i>myxoma</i> are also discovered, but are
Myxoma.	secondary to similar growths in other organs. <i>Adenoma</i>
Adenoma.	or cylindrical-celled epithelioma as secondary to gastro-intestinal malignant disease also occurs. Lympho-sarcoma
Lymphadenoma.	or <i>lymphadenoma</i> invade the capsule and the interlobular passages, and forms tumours in the liver.
Symptoms.	<i>Symptoms.</i> —Resemble those of cirrhosis of the liver. The chief are local pain, alterations in the form and size of the liver, mechanical interference with the functions of the liver and neighbouring organs, and impairment of general nutrition. The disease sets in insidiously. The patient feels that he is losing flesh and strength without a cause, and there is wasting of the body. He complains of a sense of discomfort, amounting almost to pain, and a feeling of tenderness in the liver. The pain is sometimes excruciating, and comes on in paroxysms. If the liver be examined at this stage, it is found sensitive to pressure, and contains one or more hard lumps. It is irregular in form, and is also considerably enlarged. The enlargement may be felt downwards, sometimes as low as the brim of the pelvis. There is tendency to rapid and progressive increase. The obstruction to the main hepatic ducts and vessels, both by these nodules and by the enlarged glands in the hepatic fissures, leads to persistent jaundice, and in some cases, owing to the cirrhotic condition, these nodules lead to ascites.
Local pain.	
Alteration in form and size of liver.	
Interference with liver functions.	

The obstruction of the portal vein also leads to ascites. The spleen is seldom enlarged. The digestion is also much deranged, and there may be dyspnœa and even cough. There is also marked cancerous cachexia, with rapid wasting and debility. Often thrombosis of femoral veins occurs. The progress is extremely rapid. The urine is very scantily secreted and deposits abundant urates.

*Diagnosis.*—*Cancer* seldom occurs before forty. The existence of nodular swelling, its rapid growth, and cancerous cachexia all point to cancer. May be mistaken for waxy liver, cirrhosis, catarrh of bile-ducts, hydatids, and syphilitic disease. In the *waxy liver*, the liver is smooth, uniformly enlarged, but the progress is slow. There is no pain, no tenderness, no cancerous cachexia, and the spleen is enlarged. There may be albumen in the urine, and history of low state of the system, as syphilis or of protracted exhausting disease. In *cirrhosis* the liver is large, nodulated, and tender. There is jaundice and ascites, but the history of drinking will at once dispel the doubt of cancer. *From a gall-stone.*—In gall-stone there is intense pain, jaundice, vomiting, followed by emaciation, and loss of strength. In cancer the emaciation and loss of strength precede pain and jaundice. In gall-stone there may be previous history of colic, and vomiting may be present often without pain. In cancer vomiting and pain coexist. *From a hydatid.*—The hydatid tumour is fluctuating and nodulated; there is fremitus; intense, persistent jaundice, ascites, œdema, emaciation, failure of health, and considerable enlargement. The disease lasts for a very long time. *From syphilitic liver.*—In syphilitic liver there is history of syphilis, there are marks of ulcers in the throat and presence of nodes. The liver is of small size, of soft consistence, and not tender on pressure.

*Duration.*—Death usually occurs within six months, or may be prolonged to two years. Death is generally due to

Impaired  
nutrition.

Diagnosis.

Waxy liver.

Cirrhosis.

Gall-stone.

Hydatid.

Duration.

gradually increasing asthenia, or may be hastened by complications, as peritonitis.

Treatment.

*Treatment.*—The disease is incurable. It is only palliative. The pain may be relieved by sedatives. The sleep restored by anodynes and soporifics. The digestion improved by tonics and a light nourishing diet. The diet should contain nitrogenous principles of food, and little of sugar and oily substances. Vomiting may be checked by bismuth, hydrocyanic acid, creasote, &c.

Diseases of  
biliary pas-  
sages.

### DISEASES OF THE BILIARY PASSAGES.

These include inflammation of the hepatic ducts, the cystic duct, and the common duct. They also include disorders of the gall-bladder; obstruction and closure of the excretory gall-duct, and consecutive dilatation of bile-ducts; and biliary concretions, or gall-stones. The larger ducts and gall-bladder are lined with mucous membrane, with cylindrical epithelium, and racemose glands. The mucous membrane is often the seat of catarrh.

Catarrh.

*Catarrh of the biliary passages.*—It is an inflammation of the biliary ducts and of the gall-bladder. The secretion of the mucous membrane is increased, and it also becomes muco-purulent. The lining membrane is also thick and swollen with exudation. The narrow canals are obstructed by bile as well as by the thickened membrane, and thus cause mechanical impediment to the escape of bile. The obstruction chiefly affects the portion of the common duct embraced in the intestinal walls. The disease is generally temporary, and subsides in two or three weeks. Sometimes causes permanent closure. In cases where the catarrh is a result of excessive hyperæmia of the liver the gall-duct also participates. This is the common cause of jaundice in carcinoma. The same is true of temporary jaundice with multilocular hydatids, and in jaundice due to heart or lung disease.

*Causes.*—Biliary calculi or extension of inflammation from the liver-substance, exposure to cold, presence of gastro-intestinal disorder, all lead to it. It is often connected with pneumonia or other acnte inflammations. May be connected with infectious fevers. Causes.

*Post-mortem appearances.*—In acute cases the mucous membrane is reddened, relaxed, and swollen. The surface is covered with mucus and epithelial masses. If swelling be considerable the ductus choledochus becomes completely obstructed, and the emergent ducts are dilated with bile. The surface is covered with mucus and epithelial cells. After the catarrh has lasted for some time, suppuration, hæmorrhage, or ulceration occurs as a consequence, or swelling and hypertrophy of the membrane, and an obstructive plug of mucus and epithelium remain. In cases where catarrhal inflammation of the duodenum extends to these ducts it leads to narrowing of the passages, and also to dilatation of the gall-bladder. The same is the case when a gall-stone obstructs the bile ducts. In some cases false membrane forms upon the mucous surface, and occasionally polypi are developed. Post-mortem appearances.

*Symptoms.*—At first they resemble those of gastro-intestinal catarrh and some gastric fever. There are dyspeptic symptoms, with nausea, vomiting, and constipation. That there is catarrh of the duct is known by these symptoms, gradually followed after a week or two by those of obstructive jaundice, tenderness, enlargement of the liver, and enlargement of the gall-bladder, which latter appears as a soft fluctuating tumour. If the course be favorable, the tongue becomes clean, there is diminution of dyspeptic symptoms, and the color of fæces shows that the ductus choledochus is reopened. The skin remains yellow long after the fæces have shown a natural colour. Symptoms.

*Terminations.*—It usually ends in resolution. Sometimes Terminations



it becomes chronic, and may continue for months, and the patient becomes emaciated ; or it may terminate in complete obstruction of the duct. Very often constant irritation of discharge leads to suppurative inflammation of the ducts and of the bladder, as is known by pain and tenderness in the gall-bladder, and by the presence of a fluctuating tumour. Very often chills and marked rigors are noticed in these cases, and there may be neither jaundice nor enlargement of the liver.

Treatment.

*Treatment.*—Treat the gastric and intestinal catarrh. Sometimes emetics are useful, as during the act of vomiting the bile is forced out of the ducts and bladder and obstruction removed. Mustard footbaths, or fomentations over the liver are useful. If constipation exists give laxatives.

Dilatation  
of bile ducts.

### DILATATION OF THE BILE DUCTS.

When the catarrh of the ducts continues unabated, or when the excretory ducts remain obstructed or closed for a long period, dropsy results, and is known as *Dilatation of the bile-ducts*. In this affection the mucous membrane of the bladder also secretes unhealthy fluid, and which with the normal accumulation increases the dilatation of the gall-bladder.

Causes.

*Causes.*—The ducts are most often closed by catarrh. If the hepatic duct is closed, the ducts of the liver alone become dilated. If all the ducts are obstructed, the liver ducts and the gall-bladder all become dilated.

Anatomical  
appearances.

*Anatomical appearances.*—If the orifice be completely closed, bile-duct is dilated, and is as large as the small intestine. The liver is enlarged. The gall-bladder is either shrivelled up or dilated. The obstruction of the ducts, wherever situated, leads to arrest of the flow of bile ; which is also altered in quality ; to dilatation, and other changes in the ducts ; and to disintegration and degenera-

tion of the hepatic cells. As a consequence bile is thin and watery, and of a dark green colour. The walls of the ducts may be thick, or thin and ulcerated, and perforations are seen on them. On section gall-ducts look like cysts filled with bile. In dropsy of the bladder, the bladder has lost its structure, and looks like a serous membrane. As a result of obstruction the liver is increased in size at first, but gradually it becomes atrophied. The hepatic texture is soft, œdematous, jaundiced, and of a greenish hue. Under the microscope the cells are found stained with bile, and contain oil globules and granular débris. The tissue yields leucine and tyrosine.

*Symptoms* depend on absence of bile from fæces, on changes going on in the liver, and on accumulation of bile and other effete matters in the blood. These are marked jaundice, pale fæces, the liver is enlarged, and the gall-bladder dilated. Symptoms.

*Treatment.*—Same as in obstruction of hepatic ducts. Treatment.

## GALL-STONES.

Gall-stones.

These are formations of concretion from bile, or are particles of mucus or foreign bodies, which serve as nuclei. Probably are due to some change in the composition of bile. May be smooth or granular. May be often three or four inches in length, and weigh from 15 grains to 20 drachms. The granules are known as biliary gravel. May be solitary or exist in great number. Their form varies with their relation during growth with the surrounding parts; are formed by the addition of solid matter upon a nucleus. The solid matter may be a piece of worm or a clot of blood or merely epithelium lining the duct. Their chief seat is in the gall-bladder. *Characters.*—They are generally globular or pear-shaped. When several are found together they usually present polished facets. May be soft and friable or hard; they are generally greasy to the feel. Often branched

Characters.

when formed in small bile ducts. If previously developed in the bile duct, they are moulded according to the shape of the duct. Their size varies from a millet seed to a small apple. When fresh, their specific gravity is high; but when dried they float in water. They consist of crystals of cholesterine, about 75 per cent. of biliary colouring matter, of decomposed bile acids and mucus. Sometimes they consist entirely of fragments of cholesterine, or of alkaline salts. May be white or deep black. The black variety, when cut, presents a black nucleus, and a crust which is generally of concentric laminæ.

**Causes.**

*Causes.*—The disease is rare before forty, is more common in females than in males, owing to their sedentary habits. Persons addicted to extreme indulgence in eating and drinking, and in those of a gouty diathesis or suffering from renal calculi, are commonly attacked.

**Theory about  
their  
formation.**

*Theory about their formation.*—It is said to be due to the inspissation and stagnation of bile; hence it is oftener in the gall-bladder than in the hepatic ducts, and very frequent in cases of carcinoma or other disorders of the liver, and depends upon the excess of cholesterine and colouring matters. Some believe that bile while undergoing necessary changes, cannot hold certain elements in solution, as soda or lime, and as a consequence these elements are precipitated with cholesterine and pigment matters. Others are of opinion that the ingredients of bile deposit upon mucus, or upon a foreign body in the duct or gall-bladder, and thus a gall-stone is formed.

**Symptoms.**

*Symptoms.*—Biliary calculi are often found on post mortem, which showed no signs during life. Their passage along the duct into the intestines gives rise to severe paroxysmal colicky pain, coming on just after an effort, or two or three hours after food. With the finger we often trace hard crepitating lumps in the region of the gall-bladder. Their irritation and subsequent inflammation

lead to pain and tenderness in the right hypochondrium, the pain shooting over the abdomen, round the side, to the back, or to the right shoulder. Sometimes pressure over the abdomen gives relief. There is fever. Often an abscess forms superficial to the bladder, and the gall-stones escape with its contents. When the abscess opens into the bowels, the stones are discharged with the fæces. The stools are clay coloured owing to an impediment to the escape of bile into the intestine. The most striking symptom is noticed on the escape of stone along the cystic and common ducts. There is more or less severe pain, which may, Pain. with intermissions or exacerbations, last for several hours or days. The pain generally increases with the paroxysm. The patient, after repeated attacks of pain, becomes exhausted and collapsed; his face looks anxious; faintness, Collapse. nausea, hiccough, and vomiting set in, and death occurs from syncope. In some cases the pain is agonising and the patient screams from pain. The pain is described as a tearing, or constricting, or cutting pain, and is attended with cramps. It is chiefly referred to the pit of the stomach, or to the umbilicus. It often ceases suddenly, either from slipping back of the stone into the gall-bladder or, as in favorable cases, the stone reaching the duodenum and passing off by the bowels, in which case the calculi may be detected very often in the stools; or the stone may enter the stomach, and be vomited. The intensity of pain varies with the size and angular shape of the stone. Where the stone remains obstructed in the bladder jaundice, enlargement of the liver, Jaundice. and dilatation of the gall-bladder occurs. Faintness and vomiting have no relation with the pain. The patient may have rigors or chills, or he may be cold and pale and bathed in sweats, and may have severe vomiting. In some cases there may be symptoms of obstructed jaundice. As a rule, jaundice coming on after symptoms of obstruction, is pathognomonic of biliary calculi.



## Results.

*Results.*—When stones are formed in the *gall-bladder* they entirely fill the bladder, and its function therefore is suspended. Their irritation leads to inflammation of the mucous membrane, and suppuration and ulceration result. The abscess may burst through the abdominal walls, or may open into the intestines, stomach, or lungs. If stones are formed in the *cystic duct*, the canal is completely obstructed and the gall-bladder is shrivelled up or dilated into a serous cyst. If in the *common duct* the outward flow of bile is obstructed; bile collects into the gall-bladder and in the hepatic ducts, and distends them. Their irritation leads to ulceration, perforation, and local abscess.

## Treatment.

*Treatment.*—It is unsatisfactory. The stone cannot be removed, cannot be dissolved, and cannot be arrested from further growth. We can only relieve the pain, and thereby cause onward movement of the stone, and thus prevent the formation of fresh ones. To relieve the pain opium with belladonna, or inhalation of chloroform is of great service. Some recommend ether  $\text{ʒij}$  with turpentine  $\text{ʒij}$  internally, and begin with  $\text{ʒss}$  and increase. Vomiting may be allayed by ice, or by use of warm water containing alkalies. For the expulsion of the stone purgatives are highly beneficial; diet should be light, but highly nutritious; stimulants should be avoided and active exercise taken. Locally fomentations and even counter-irritations are useful.

## Hypertalgia.

*Hypertalgia* signifies a neuralgic or nervous pain in the liver. It is a functional disorder unattended with any change of structure; is often due to hysterical diathesis; the pain is often so acute as to simulate acute inflammatory disease. The disease is characterised by slight uneasiness or sense of weight in the hepatic region, often merging into pain. The pain is generally absent when the mind is occupied. It may be slight or severe, stabbing or lancinating. There is no fever; pulse is quiet, tongue clean,

appetite good, and secretions and excretions healthy. The patient often feels uneasy in his mind and has a constant dread of some serious malady supervening.

The causes are those of neuralgias generally. May affect nerves, either of common sensation or of organic life. May be due to sympathetic irritation, as in dyspepsia; to poisoned blood, as in malaria, cachexia; or to pressure upon or other causes irritating the hepatic nerves.

*Diagnosis.*—*From pleurodynia.*—Pleurodynia is common. Occurs chiefly on the left side, in chlorotic females, or in those suffering from leucorrhœa. *Hyptalgia* is rare; occurs in males, and on the right side. *From muscular rheumatism.*—Rheumatism occurs after a common cold, in it the pain increases by pressure and by movement; there is frequent accompaniment of pain in other fibrous and muscular structures. *In hyptalgia* pain is not increased by pressure or by movement; cold is not the cause, and there is no pain in other structures. *From hysteria.*—In hysteria the pain is paroxysmal. The disease occurs in females, in them there is globus hystericus, limpid urine, and flatulence. The peculiar hypochondriacal pain occurs during change of life. All these symptoms are absent in hyptalgia. *From abscess in the liver.*—In deep-seated and insidious abscess there is no fever, no signs of previous inflammation or congestion; there is only a sense of uneasiness or dull pain, or a sense of weight, with slight cough, and scanty urine. If with these symptoms the patient enjoys good health and also gains flesh, the case is one of hyptalgia and not of abscess, but should rigors, cold sweats, and hectic fever occur the serious nature of the disease is understood. *Partial congestion of a hepatic lobe.*—It is stated from analogy that in the brain, as in various other viscera, irritation starting from one point of the brain spreads in some other part of the encephalon producing anæsthesia or convulsions. That in the liver by a similar reflex action at one part pain is produced in other

Causes.

Diagnosis.  
Pleurodynia.Muscular  
rheumatism.

Hysteria.

Abscess in  
the liver.Partial con-  
gestion of  
hepatic lobe.

parts of the liver. In congestion of the hepatic veins the uneasiness or pain resembles that of hyptalgia because the hepatic veins are not well supplied with nervous influence as the portal system. Hyptalgia occurs in India during the cold season, and chiefly among the Europeans.

*Treatment.*—Where no organic derangement can be detected, and only pain exists, give arsenic internally, and locally use sedative embrocations; occupation of the mind is the best remedy, change of air may also be recommended.

## Pancreas.

## PANCREAS.

*Pancreas* literally means flesh, it resembles in structure and functions the salivary and the duodenal glands. It is of a small size and deep seated, and consists of a head embraced by the duodenum, and a duct. The duct is in length about six or eight inches, in breadth is an inch and a half. The whole weighs about eight ounces. It is deeply situated in front of the aorta, and behind the stomach, and is on a level with the first lumbar vertebra. It secretes a large quantity of fluid which is an important agent in the emulsification of fat; in the conversion of starch into dextrine and sugar; in the conversion of albuminous food into products fit for digestion. Thus retention of the pancreatic fluid interferes with general nutrition, and much fat or starch appears in the alvine discharges. The secretion consists of a viscid alkaline fluid, having a specific gravity of 1008; it forms a kind of emulsion with fat, and thus prepares it to be absorbed by the lacteals. The diseases of the pancreas are of very little clinical value, and are known to exist by the fat being imperfectly digested.

## DISEASES OF THE PANCREAS.

Diseases of  
the pancreas.

Pancreas is subject to congestion and inflammation ending in abscess; to morbid growths which are rarely primary, as the scirrhus; to calculi of varying sizes obstructing the duct; and to catarrhal inflammation of the duct.

*Catarrhal inflammation.*—Is seldom known during life. Abscesses are found post mortem in the gland, but are pyæmic. Catarrh of the duct is common with the catarrhal inflammation of the hepatic duct, and, like it, may lead to obstruction. During catarrh there is a deep violent paroxysmal pain in the abdomen, a little below the epigastrium, accompanied in some cases by extreme tenderness. The pancreatic secretion is in excess, and is of an altered quality, hence we find a viscid slimy fluid in the saliva, and also intimately mixed with the stools. When the secretion is scanty the stools are only streaked with fat or with oily matter; very often there is nausea, vomiting, loss of appetite, emaciation, and deranged digestion. The enlarged gland by its pressure upon the neighbouring organs causes derangements of the liver and of the alimentary canal, and is seen or felt as a hard, fixed, and rounded swelling at the base of the stomach, a little below the epigastrium.

Catarrhal  
inflamma-  
tion.

*Morbid growths.*—Carcinoma are rarely primary, are due to extension of disease from the stomach or peritoneum. *Scirrhus* is a common variety of carcinoma to which the pancreas is liable. *Calculi* are also to be found in the pancreatic duct; they often lead to obstruction of the duct.

Morbid  
growths.

Scirrhus.

Calculi.

*Obstruction of the duct.*—It may be due to calculi, to stricture, or to malignant or other growths within, or to compression from without. The duct behind the obstruction is dilated owing to the accumulated secretion.

Obstruction  
of the duct.



**Treatment.** *Treatment.*—Seldom seen during life. Improve the general health; vomiting should be checked by bismuth or creasote.

Diseases of  
the spleen.

## DISEASES OF THE SPLEEN.

**Anatomy.**

The normal spleen occupies the left hypochondrium, is situated upon the cardiac extremity of the stomach, its convex surface being in contact with the diaphragm, and is not felt below the ribs. It is of an oblong flattened form, of a dark colour, and very vascular. In structure it is made up of a fibrous coat which is also continued into the splenic substance forming the trabeculæ into which the splenic pulp is contained. The pulp consists of blood-vessels and of Malpighian corpuscles. It weighs about six ounces, is about five inches long, and more than three inches broad. It presents vertical fissures in which are found apertures for exit and entrance of vessels. It has no excretory duct.

**Function.**

It is said to assist in the elaboration of the blood and to regulate the quantity and quality of blood in the body. It is also concerned in the assimilation of albumen of the blood, and in the disintegration of its red corpuscles. The white corpuscles are said to be formed by it. Thus, excess of white corpuscles is common in leucocythemia.

**Hyperæmia.**

*Hyperæmia.*—The spleen becomes enormously distended with blood from slight causes, especially those which interfere with the functions of the skin, liver, and kidneys. *Congestion* is very common during digestion or after meals. It may be either fluxional or obstructive.

**Acute  
congestion.**

*Acute or fluxional congestion.*—It is commonly observed in many acute infectious diseases, as typhus, typhoid, malarious fevers, and pyæmia. It may be vicarious to menstruation; injury, as in hæmorrhagic infarction, may cause it. *Passive or obstructive congestion* is physiological, and occurs in a few hours after each meal; it may also be due to mechanical impediment to the portal circulation, as in

**Causes.**

**Passive.**

cirrhosis of the liver, in chronic lung or heart diseases, or to causes which interfere with the proper action of the liver. Causes.  
The enlargement of the spleen appears and disappears rapidly.

When congestion is long continued as in portal obstruction, or repeated as in ague, it often leads to inflammation, to enlargement and softening, or to permanent induration of the organ.

*Post-mortem appearances.*—The spleen is much enlarged, Post-mortem appearances.  
owing to distension of the vessels of the spleen, and to accumulation of blood in the intervacular passages. The capsule is stretched and smooth. The spleen is often five or six times heavier than its own weight. It is of a dark colour, often pulpy, of diminished consistence, and is easily lacerable.

*Symptoms.*—Often during life cases of simple congestion Symptoms.  
are known by the presence of a tumour in the splenic region. The disease develops generally without pain. During health its lowest point is close to the anterior extremity of the eleventh rib. In disease the organ is enlarged. It rises into the chest and also spreads downwards and inwards into the abdomen, and may even occupy the whole of the left half of the abdomen. It is readily moveable under the fingers and during respiration. On its anterior edge there are splenic notches. It is seldom tender to the touch. Even in extensive cases rupture of the spleen is rare, but when it occurs it is fatal from the escape of blood into the peritoneum or from peritonitis.

*Inflammation of the spleen* occurs usually from obstruction of a small artery by an embolus. Inflammation.  
The embolus may be from valvular disease of the left heart. May also be due to malarial affections, pyæmia, or foreign bodies. The primary inflammation of the spleen is very rare. Injuries more often cause it. *Hæmorrhagic infarction* is very frequent.

Post-mortem  
appearances.

*Post-mortem appearances.*—The spleen is enlarged by fluxionary hyperæmia. It is brownish red and hard, or very

Infarctions.

dark and soft. The infarctions are about a cubic inch or two in size, generally rounded and studded with numerous dark, wedge-shaped, projecting masses with the apex within, and base towards the surface. The wedge is at first dark and very firm, but in advanced cases, the colouring matter having been absorbed, it assumes a yellowish, then buff, and at last a white colour. Very often

Fatty  
degeneration.

the infarctions end in one of three ways. 1. Fatty degeneration, the mass becomes absorbed, and in place of infarction a retracted cicatrix is left. 2. A yellow cheesy mass, possibly caseous degeneration or calcification, remains. 3.

Caseous  
degeneration.

Abscess.

In rare cases it breaks down, and an abscess with a purulent fluid and detritus is formed. They give rise to local peritonitis.

Symptoms.

*Symptoms.*—There are rigors and fever, vomiting with pain and tenderness in the splenic region, and enlargement of the organ. The pain is due to localised peritonitis, and is increased on respiratory movements. When an abscess is formed there is a fluctuating tumour observed in the splenic region, also sympathetic vomiting, rigors, hectic fever, and rapid wasting.

Treatment.

*Treatment.*—Subdue inflammation by leeches, fomentation, and poultices, and when an abscess is formed treat it as an hepatic abscess.

Hypertrophy  
of the spleen.

*Hypertrophy of the spleen.*—True hypertrophy follows repeated or long-continued congestion, and is associated with portal obstruction. It is thus found in cirrhosis of the liver; when occurring after malarious fevers, it is known as *ague cake*. It is also found in connection with syphilitic cachexia, in leucocythemia, and in pregnant women. It is common in rickets.

Post-mortem  
appearances.

*Post-mortem appearances.*—When due to congestion the spleen is enlarged both in size and weight, is of a firm

consistence, and not altered in form. On section it is pale and dry, and presents here and there dark pigment patches.

*Symptoms.*—There is a sense of fulness, tension, and more or less pain or tenderness in or about the left hypochondrium. A general condition chiefly known as splenic cachexia, as characterised by a peculiar sallow aspect, dingy discoloration of the skin, and anæmic appearance of the gums, general wasting, prostration and dyspnœa. Such patients are liable to hæmorrhages from various tissues of the body; they suffer from derangements of the stomach and bowels, and generally from low state of the system with tendency to sloughing sores from slight causes. In long-continued cases there is tendency to abdominal dropsy. Similar symptoms are also due to hepatic lesion.

Symptoms.

Splenic  
cachexia.

*Duration.*—Is much prolonged. Where death takes place it is from anæmia, or from hæmorrhage, or from complications.

Duration  
and  
termination.

*Treatment.*—When enlargement is the result of ague, quinine and arsenic or purgatives are useful. Depletion and mercury are most injurious. Health must be improved by nutritious diet. For reducing the size of the spleen it is recommended to give phosphorus internally, and to use friction of iodide of mercury ointment externally.

Treatment.

*Amyloid degeneration or lardaceous spleen.*—Is associated with lardaceous degeneration of other organs. In this affection the section of the spleen presents lardaceous deposits in the minute arteries and in the cells external to them. It commences in the Malpighian bodies and vessels, and resembles boiled sago. The spleen is gradually enlarged, is uniformly hard, and dense; other organs being also involved in the albuminoid deposit. Its capsule is smooth and glistening. On section the spleen presents in the early stage an appearance resembling sago grains. In advanced cases the whole structure participates in the degeneration,

Amyloid  
degeneration.



and the surface is glistening, translucent, and pits on pressure. It is very heavy and easily lacerable.

*Symptoms.*—There is more or less anæmia with cachexia, general dropsy, tendency to hæmorrhages and debility. There are primary degenerative changes in other parts, and degeneration of the spleen is always secondary to them.

*Treatment.*—Remove the cause of degeneration. Improve general health by tonics and iron. Administration of good food, and attention to hygiene are necessary.

*Atrophy.* *Atrophy of the spleen.*—Is common, but clinically considered it bears no importance. Like atrophy of the liver, as in cirrhosis, it occurs as a consequence of overgrowth of connective tissue. In some cases it may be due to investment of the organ by a dense and slowly contracting fibrous tissue.

*Cysts.* *Cysts.*—Simple cysts are rare.

*Hydatids.* *Hydatids* are common, as in the liver, and are alike in symptoms and treatment.

*Tubercles.* *Tubercles* are common in young children, and exist with tubercles in other organs. They are frequently miliary and grey, and often mistaken for Malpighian bodies, but the tubercles when present are studded in various parts of the spleen, and some of them have actually undergone caseation. Yellow tubercles are found to exist in connection with yellow tubercles in other parts; they are rarely clinically known. *Symptoms* are those of congestion, of hypertrophy, or of abscess.

*Malignant disease.* *Malignant disease.*—The peritoneal or connective tissue about the hilum becomes the seat of malignant disease through continuity with the malignant disease of the peritoneum or of the stomach.

*Tumours.* *Tumours.*—Tumours of the great omentum or in the neighbourhood of the spleen often simulate splenic tumours.

*Leukæmia.* *Leukæmia.*—Is a temporary increase of white corpuscles

of blood, and takes place in several physical and pathological conditions, as in pregnancy, inflammatory diseases, after phlebotomy. Some physiologists describe leukæmia as a change in the constitution of the tissue of the blood. The number of white corpuscles increases, and of red diminishes.

*Causes.*—May depend on disease of the spleen, and is then known as splenic leukæmia; when on disease of the lymphatics, it is called lymphatic leukæmia. Is most often in males and in middle age. Causes.

The changes in the spleen and lymphatic glands consist chiefly in an increase of the cellular elements composing the spleen pulp or filling the cells of the lymphatics. As these same cell elements are found in the blood, it seems that the leukæmic tumours are due to increased formation of cellular elements and not to their retention. In some cases other organs produce similar cells.

*Morbid anatomy.*—In normal blood there is one white to 350 red corpuscles. In leukæmia it may be one white to two red corpuscles. In the splenic form the white corpuscles are not distinguished from those of normal blood. In the lymphatic form many free nuclei and small cells are found. In leukæmic blood the sp. gr. is less than that of normal blood. Normal blood is 1055. Leukæmic blood is 1036-49. The proportion of water in the serum has somewhat increased. There is less iron, hypoxanthin, lactic, formic, and acetic acids. On post mortem there is often smeary pus-like coagula in the right heart, same in veins of the heart and of cerebral membranes, and in small branches of pulmonary arteries. Spleen is generally enlarged; its resistance is little increased. Thickened trabeculæ forming white striæ through the splenic pulp. Capsule of the spleen is thickened. In many cases, old hæmorrhagic infarctions are found. Morbid anatomy.  
Splenic form.  
Lymphatic form.

Lymphatic  
form.

In the lymphatic form the lymphatic glands formed huge tumours, chiefly the mesenteric, lumbar, epigastric, cervical, axillary, and inguinal. Spleen generally is also affected. Sometimes spleen may be natural. The enlarged glands are soft, pale, their surface smooth and watery-looking; their cortical substance is especially swollen. Enlargement may be due to formation of cells, nuclei, and granules similar to those of normal glands. Liver is generally enlarged. Distinct connective-tissue corpuscles are sometimes found in the liver and kidneys.

Symptoms.

*Symptoms.*—Swelling of the abdomen; enlargement of the spleen. In the lymphatic form the enlargement of glands in the neck, &c. The patient becomes pale and cachectic and even waxy. Under microscope blood presents several white corpuscles. The course of the disease varies, often numerous hæmorrhages, especially from the nose. If hæmorrhagic diathesis does not develop the patient may live for years. There is occasional pain in the splenic region. In such protracted cases liver is generally enlarged. Patients become emaciated and pale. There is dyspnoea from pressure on the diaphragm, and uric acid sediment in the urine. Often cough with mucous expectoration, or interstitial catarrh with diarrhoea occurs. Often towards the end dropsy appears. There may also be fever towards the end.

Waxy look,

Hæmor-  
rhages.

Enlarged  
liver.

Varieties.

*Varieties.*—Leukæmia is a tendency of the sanguineous system to become lymphatic. Three varieties are known. 1. Spleen and lymphatics enlarged. 2. Spleen only enlarged. 3. Lymphatics only, in order of occurrence. Two kinds of leucocytes are found in blood in leukæmia, large and small, the large are said to come from the spleen, the small from the lymphatics. *Prognosis.*—No case of recovery is known. *Treatment.*—Quinine, iodine, and iron are tried.

Prognosis.

Treatment.

## DISEASE OF THE SUPRARENAL CAPSULES.

## ADDISON'S DISEASE.

Diseases of  
suprarenal  
capsules.

Suprarenal capsule, like other ductless glands, as the spleen, thymus or thyroid bodies, assists during health in the proper elaboration of the blood, and in disease it leads to a peculiar series of phenomena. It is a triangular body resembling a cocked hat placed above each kidney. In structure it is yellowish red, and is from one and a half to two inches in length, and about an inch in breadth, each weighs about quarter of an ounce. It consists of elongated vesicles enclosed in a fibrous matrix with network of connective tissue, in the meshes of which are imbedded cells and nuclei. The diseases to which it is liable are *tubercle* and *malignant* disease; the tubercle or otherwise called Addison's disease is a peculiar form of progressive anæmia, with a peculiar bronze discoloration of the skin. It is associated with tubercular degeneration of suprarenal capsules, These cases of bloodlessness generally terminate fatally.

Addison's  
disease.

*Pathology.*—The nerves supplying the capsules extend to solar plexus and semilunar ganglia. That these nerves are at first irritated, and subsequently they become atrophied and destroyed. The explanation of the phenomena is very uncertain. It is explained by the intimate connection between the suprarenal bodies and the sympathetic in the abdomen. That these ductless glands influence the condition of the blood as the spleen. But in this disease blood is not altered, and that disease of the sympathetic in the abdomen does not produce Addison's disease.

Pathology.

*Causes.*—*Predisposing*: most common in labourers, and in those whose work predisposes them to accidents or injury. *Exciting*: extension of inflammation from the diseased or carious vertebræ. Injury, shock to the nervous system, and even malaria may cause it.

Causes.

*Post-mortem appearances.*—Miliary tubercles are found

Post-mortem  
appearances.



in the suprarenal bodies, as in other organs; they undergo various changes, and when degenerate they lead to more or less destruction of the suprarenal bodies. At first the morbid appearances are those of chronic inflammation.

Chronic  
inflammation

The organ is infiltrated with a low or degenerative form of exudation, forming a firm fibrous material. The capsule is tense, and in places destroyed; the gland is enlarged, firm, and nodulated. Its surface is irregular. The whole organ is converted into a greyish-white, semi-transparent, homogeneous substance, which after a time undergoes caseous degeneration, and forms either firm, opaque, cheesy nodules, or creamy, purulent fluid. None of the original structure remains.

Original  
structure  
lost.

Under the microscope the gland consists of a fibrillated stroma, with numerous lymphoid corpuscles containing caseous masses made up of cells, nuclei, granular matter and oil. In many cases the covering of the gland is much thickened, and forms adhesions with the neighbouring parts. The nerves are enclosed in a dense fibrous tissue which is also hypertrophied. Caseous degeneration in other parts is sometimes found associated with it. Thus we often notice miliary tubercles and even caseous degeneration of the neighbouring glands, as the salivary glands, and glands of the bowel. There may be atrophy of the mucous membrane of the stomach and intestines; sometimes there are small ulcers in the stomach, with enlargement of the spleen.

Caseous  
degeneration.

Skin.

The skin is bronze-like and resembles that of a mulatto. The discoloration is general, it never presents an abrupt margin, is occasionally spotty, and is deep on parts which are superficially destroyed. Skin over deep cicatrices remains pallid. Is said to be due to the accumulation of pigment in the cells of the rete mucosum.

Symptoms.

*Symptoms.*—Skin grows dark, but patients may die before this becoming marked to attract notice. A peculiar

cachexia sets in without any obvious cause. The conjunctivæ are not discolored, and the nails remain white. The disease mostly resembles *splenic cachexia*. It may look like typhus, but the temperature will distinguish it at once. There is extreme prostration, but no loss of flesh; there is a peculiar tendency to the formation of fat. He cannot walk long distances without becoming short of breath and prostrated. The pulse is accelerated, is extremely soft, and compressible. There is sometimes pain in the back or in the epigastrium; also tendency to syncope, palpitation of the heart, and breathlessness. The discoloration of the skin sets in slowly, and may be due to the deposit of pigment granules in the rete mucosum and in the cutis, and is noticed by patient's friends at first. It usually commences and is most marked on exposed parts, and in those which are the usual seat of pigment. Thus we find it on the face, neck and hands, and also in the axilla, the groins, round the umbilicus, in the areolæ of the nipples, and over the external genitals. It is deeper in the extensors of joints than the flexors. Generally it shades off gradually, but may be spotty, and where the skin is blistered or superficially destroyed, it presents deeper colour and has defined margins. In some cases the mucous membrane, at its line of junction with the lips, also the gums, cheeks, and tongue, become discolored, and dark streaks are often seen opposite the angles of the mouth. There is disorder of the alimentary canal, loss of appetite, nausea, vomiting, and occasional smart pain in the abdomen. The urine is scanty, of low specific gravity and deficient in solids. The temperature is low. There is occasionally giddiness and dimness of vision. As the case progresses, debility increases, the circulation is less perfect, and there is improper aeration of blood, the patient feels chilly, the hands and limbs become cold, and the lips and nose more livid; the breath assumes a peculiar disagreeable odour. He soon becomes apathetic

Splenic  
cachexia.

Discoloration  
of skin.

Disordered  
alimentary  
canal.

Disordered  
circulation.

and restless. Mind remains clear to the last. The disease may last for a long time, generally for one year. Death takes place from asthenia, or from faintness on any exertion.

**Treatment.** *Treatment.*—Promote health and strength by attention to nutritious diet, tonics, and hygiene, and thus prolong life. Attend to the alimentary canal. Give perfect rest to body and mind. Treat the urgent symptoms as they arise. The patient should wear warm clothing next the skin, and live in a moderate temperature. The cure is beyond our power.

**Tumours.** *Tumours.*—Malignant diseases attack suprarenal bodies secondarily. The primary affection is rare. Tumours often attain very large size, and may be mistaken for tumours in the kidney. Like renal tumours they are rounded and immovable, they lie on the back of the abdomen, and colon lies in front of them. *Symptoms* are those of emaciation, of cachexia, but there is no discoloration of the skin.

Disease of  
kidneys.

## DISEASES OF THE KIDNEYS.

Anatomy.

The urinary organs include kidneys, ureters, bladder, and urethra. The kidneys are ovoid bodies, seated deeply one on each side of the lumbar region. They are convex anteriorly and flat on the posterior surface. The upper extremity is larger than the lower. The outer border is convex, the internal notched. At this border there is a slit called the *hilum*. They are about four or five inches long, and one and a half to two inches broad. Each weighs from four to six ounces. The function of the kidneys is to separate from the blood those effete matters which are constantly added into it from various sources. These effete matters with water constitute urine. The urine or excretion varies considerably in quantity and quality during health and in

Physiology.

disease. In disease its composition is considerably altered. It retains in addition those constituents which should be eliminated from the blood, and also adds to its original constituents others, as mucus, and the like from the diseased structural condition of the organs. Besides the results manifested by the changes in the urine, owing to the non-elimination of effete products which ought to be discharged with the urine, there are other morbid changes which may affect the whole system. There are other morbid sensations as pain in the lumbar region behind, and in the hypogastrium in front. It may vary from a feeling of uneasiness and fulness to actual pain and tenderness in any of these parts, there may be also itching or tickling at the end of the penis. The pain increases with the movements of the body, it is also influenced by micturition, or by any articles of diet or drink ; in some cases the pain is shooting along the spermatic cord, into the testicles, and even the testicle may be retracted. The act of micturition may be too frequent or even involuntary, and attended with or without pain and strangury ; there may be complete retention or incontinence, or suppression of urine. The effete matters in the blood are thus circulated, and the poison is known as *uræmia*. Another morbid condition is the enlargement or contraction of the kidneys.

Changes in  
urine.

Pain.

Enlargement  
of kidneys.

*Physical examination* includes microscopic examination of the urine, and of the renal structures and examination of the kidney, bladder and urethra. In examining the urine we must observe its physical characters ; viz., the quantity passed in twenty-four hours, its colour, clearness, consistence, odour, reaction, specific gravity, and the deposit if any be present.

Physical  
examination.

By a chemical examination we determine, 1st, if present, the proportion of the normal solid constituents, as urea, uric acid, chlorides, phosphates, sulphates and hippuric acid. 2. The presence and proportion of abnormal ingredients, as

Chemical  
examination.



mucus, bile, sugar, pus, blood, fat, and albumen. Albumen is usually associated with a high temperature, especially when continued for some days. The chemical tests of normal or abnormal ingredients have been already given in the former part of this work.

**Microscope.** *Microscope.*—Healthy urine, freshly passed, if examined is absolutely structureless. If allowed to stand for a day and then examined it will be found to contain a slight cloudy precipitate which, under the microscope, reveals epithelial scales, amorphous urates, and phosphates, and occasionally other crystalline deposits as uric acid and oxalate of lime. All these deposits indicate no structural renal disease. In structural diseases, urinary tube casts are observed under the microscope. These are of five kinds. 1. Blood casts, or exudation casts, occur in renal hæmaturia, and consist of coagulated fibrin and blood corpuscles, often blended with epithelial or granular casts. 2. Epithelial, or desquamative casts consist of renal epithelium and of cells which are granular and degenerated, and often resemble pus cells. 3. Granular casts more or less opaque and studded with granular matter. They are called fibrinous casts and contain débris of degenerating cells. 4. Fatty casts contain fat globules. Fat globules may also be found in epithelial, hyaline, or granular casts. 5. Waxy or hyaline casts. They are homogeneous, glassy looking, and have a tendency to fracture transversely. They are of various sizes and contain epithelial and granular matter. Blood casts and epithelial casts indicate acute kidney diseases. Granular, fatty, and large waxy or tube casts are significant index of chronic and degenerative disease of the kidney. Large hyaline casts and fatty casts of chronic and degenerative diseases. Albumen is associated with acute and chronic Bright's disease, although it may accompany pregnancy, diseases of heart, lungs, and cirrhosis of the liver without any kidney disease.

## URÆMIA.

Uræmia.

*Specific consequences of the retention of urea in the blood.*

—In structural diseases of the kidneys urea, uric acid, and other products are retained in the blood and in the fluids of the tissues. Blood, therefore, becomes much deteriorated, it grows watery, poor in albumen and in corpuscles, and its fibrin becomes relatively increased. The patient thus becomes anæmic. Special phenomena, as thickening and contraction of small blood-vessels, hypertrophy of the heart, dropsical effusions, local congestion and hæmorrhages, inflammation of the organs in the chest, and functional disorders of the brain and alimentary canal soon occur.

*Thickening of the small blood-vessels.*—It has been shown that in chronic renal disease, and especially in granular kidney, the walls of minute arteries of the kidneys and also of the whole body become thick and hypertrophied, and their canals contracted. Some attribute these phenomena to the effort of the vessels to oppose the transmission of poisoned blood into the tissues. Others believe it to be due to a degenerative change known as hyaline fibroid conversion—a change similar to what occurs in chronic disease of the liver (cirrhosis) or in sclerosis of the brain.

Thickening  
of vessels.

*General hypertrophy and dilation of the heart* is constant in chronic kidney diseases. This condition is said to be due in some degree to sclerosis or increase of the connective tissue, but is mainly due to an extra effort it has to make in transmitting the poisoned blood onwards. The large arteries, the valves of the heart, and large veins are healthy, the extra work or obstacle is thrown upon small vessels and capillaries, as is shown by the high tension on sphygmographic board tracing.

Hypertrophy  
of left heart.

*Dropsical effusion or anasarca* is most common in kid-

Dropsy.

ney diseases, and first appears in regions in which the connective tissue is lax, as the scrotum and eyelids. On the face it appears before the limbs. In it there is no turgidity nor enlargement of the superficial veins, and the parts are anæmic and waxlike. Dropsy is not due to passive congestion, but is a result either of transudation of serum of the blood through the capillary vessels or of migration of the fluid through the walls in consequence of heightened pressure of the blood upon them. Cases of scarlatina, or of albumen or blood in the urine are followed by dropsy, and in it, during fever, a high arterial tension is noticed on pulse tracing.

Congestion  
and hæmorrhages.

*Congestion and hæmorrhages.*—Effusions into the choroid and retina lead to impaired vision, into the substance of the brain to apoplectic symptoms, and into the lung substance to pulmonary apoplexy. They may be due to transudation of blood through the vessels or their migration through their walls, or to atheromatous or fibroid degeneration of the arteries leading to rupture of diseased or enfeebled vessels. Inflammation in the organs of the chest lead to pleuritis, pericarditis, or pneumonia.

Functional  
disorders.

*Functional disorders* are numerous. They are—derangements of the stomach and bowels, of the respiratory organs, and of the brain. Of the brain the most serious are coma and convulsions.

Hyperæmia.

### HYPERÆMIA OR CONGESTION OF THE KIDNEYS.

The branches of that part of the renal artery which belongs to the middle and outer part of the cortical substance, go exclusively to form the afferent vessels. As such they enter the Malpighian capsules, and divide to form vessels of the glomeruli. They leave the Malpighian capsule as efferent vessels, break up into branches and reunite as renal veins. On the boundary between the cor-

tical and medullary substances, there is a tract in which there are arteries from which branches arise, and form *afferent* vessels of the glomeruli, and *efferent* vessels with long offshoots running into the cortical and medullary substance, and others which act as *nutrient* vessels for the medullary substance. Moreover, the renal artery has branches on which there are no glomeruli, and which are also nutritive for the medullary substance. The resistance of blood is greatest in the glomeruli, and is normally considerable, therefore, when pressure increases in renal arteries, hyperæmia is at first in the cortical substance, and next in the glomeruli; and there is little hyperæmia in other parts. When renal veins are obstructed the result is different. The narrow efferent glomeruloid vessels prevent the extension of blood through them. The contents of the arteries are at the same time usually reduced, therefore glomeruli are scantily supplied, and the quantity of urine is diminished.

*Causes.*—These are fluxional and obstructive.—*Fluxional.*—Transient plethora caused by copious draughts of liquid, glomeruli are thus overloaded. 2. Hypertrophy of the left heart. 3. Collateral fluxion from compression of abdominal aorta, compression of veins of the cortical substance by the distended tubercles, as in morbus Brightii. 4. Dilatations of the afferent vessels by palsy of the muscular coats. 5. From vicinity of inflammation. 6. Complication of diseases of the pelvis of the kidney. 7. Cantharides, copaiba, scarlatina, typhus, &c. *Obstructive.*—1. Uncompensated valvular disease. 2. Structural heart disease. 3. In impediment of heart's action as in marasmus. 4. When the capillaries of the lungs are compressed or wasted. 5. Where there is impediment to the blood entering the thorax. 6. Thrombosis of vena cava. In cases where the congestion is due to any persistent cause, it may give rise sooner or later to Bright's disease.

*Pathology.*—Impediment to the return of blood by the

Causes.  
Fluxional

Obstructive.

Pathology



renal veins renders the urine albuminous, and it may even contain blood and fibrin. This is easily explained. The congestion leads to tension of the renal vessels and of the capillaries, and if not relieved in time, actual rupture takes place, and either serous constituents of the blood transude through their coats, or blood corpuscles and albumen escape into the urine. If, therefore, congestion be not soon relieved, the presence of blood and fibrin in the delicate tubules ultimately leads to their destruction, and also to the derangement of nutrition of the glandular elements.

In eruptive and other fevers, in diphtheria, erysipelas, and in acute rheumatism, kidneys become congested, as also many other organs, and albumen in the urine appears. It is also common to find albumen with a high temperature in fevers, but in such cases albumen subsides when the cause is removed. Not so in Bright's disease, or where it begins as a sequel of fever and other disorders as towards the close of fever or the commencement of convalescence.

Post-mortem  
appearances.

*Post-mortem appearances.*—Kidneys are engorged, dark red, and enlarged from serous infiltration or dilatation of their vessels. They are soft and increased in weight. The capsule is loose. On section the Malpighian bodies are highly vascular, and stand out as red points; the veins on the outer surface are overloaded. In *recent congestion* the ducts of the pyramids are studded with mucus. There is catarrh of the canals of the pyramids, and the epithelium of the uriniferous tubes of the cortical substance is therefore swollen and detached. The cells are filled with finely granular matter, which become clear on the addition of acetic acid. Straight tubules of the medullary substance yield a yellowish creamy fluid on pressure. In cases of *passive congestion*, and when long continued, the kidneys are gravely disorganised. At first there is slow increase in the growth of the fibrous tissue, and the kidneys are indurated; ultimately they become granular, with atrophy of the cortical

Catarrh.

substance and of Malpighian bodies. Under the microscope the epithelium is destroyed, the walls of the tubes thickened, there is increased size of the intertubular connective tissue, and distension of the capillary vessels. In some cases emboli are observed in the cortical portion, and also infarctions, similar in form to those found in congestion of the spleen. Where the infarctions are absorbed we find depressed cicatrices, but where infarctions have softened down abscesses are found.

*Symptoms of hyperæmia.*—In fluxional hyperæmia, at first, there is no pain; the urine is of low specific gravity, its quantity is increased, and there is no albumen. In that form, due to abuse of diuretics, and to loss of tone of kidney substance, the urine becomes albuminous, is full of casts, and is studded with cells. The course is generally transient and harmless. Often the disease sets in with sickness, feverishness, and great thirst. There may be slight or heavy pain, with tenderness in the loins, increased by pressure or movement, and irritability of the bladder. The urine becomes scanty, dark coloured, and concentrated, depositing urates on standing, and contains albumen, a little blood, with exudation of fibrinous casts, even there may be hæmaturia. When the disease subsides the urine increases in quantity and improves in quality, and the patient recovers. In many cases inflammation readily supervenes, and leads to organic changes in the kidneys, and the urine contains various casts of tubes and also abnormal solid constituents. In some cases nephritis ends in suppuration. Occasionally uræmic poisoning and other results of Bright's disease occur.

*Treatment.*—Congestion, whether active or passive, does not call for any special treatment. When congestion is secondary its intensity is lessened with the diminution of the primary disorder. Where the congestion has an independent origin and the symptoms are threatening

Symptoms of  
congestion.

Treatment.

and dangerous, energetic treatment is necessary. Due attention to cardiac and pulmonary diseases are unavoidable. Give perfect rest. Cupping over the loins, warm baths, and active purgatives are useful remedies. Unirritating diuretics and plenty of acidulated drinks are recommended.

Acute  
Bright's  
disease.

### ACUTE BRIGHT'S DISEASES.

History.

*Croupous nephritis*.—The kidney is enclosed in a tough, thin, lightly adherent, translucent capsule. It is composed of a complicated and convoluted series of tubes lined with epithelium. Lying between the tubes and supporting and binding them is a thin, delicate network of fibrous tissue, and numerous blood-vessels. The tubes constitute tubular or medullary substance, while the granular portion at the margin is the cortical substance. Each and all of these parts are subject to disease, and, as a rule, when one part becomes affected the other always sympathises with it. Thus diseases of the tubules, or of the fibrous tissue, or of the blood-vessels all merge into one another, and are known as Bright's disease. In these affections there are

Degeneration

degenerative structural change in the kidneys, which lead to albuminuria and dropsy. The degeneration consists in the deposit of a peculiar coagulating exudation containing epithelial cells, and sometimes extravasated blood-cells. The exudation fills up the urinary tubules and ends in a few days in recovery or death, or in subsequent atrophy of its cortical and tubular structures. The structural changes bring about ultimately the same results, namely, the poor state of the blood from loss of albumen, and poisoned state of the blood from retention in the body of the constituents of urine. *Acute* is otherwise known as acute desquamative nephritis, or a stage of hyperæmia and commencing exudation, acute tubal nephritis, acute albuminuria, or acute inflammatory dropsy.

Acute  
disease.

*Causes.*—The commonest predisposing cause is scarlet fever, it is nearly as common in confluent smallpox, and occurs as a rarity in measles and the other exanthemata. Other cases arise without any disease preceding. After a wetting or some other form of chill, it seldom occurs. It arises during the typhoid stage of cholera.

*Morbid appearances.*—The inflammation involves the whole structure of the kidney, also the epithelium lining the uriniferous tubes and vessels, and the connective tissue which surround them. In acute inflammation the epithelium is most affected, and hence the disease is known as tubal or desquamative nephritis. The kidneys are enlarged and dripping with blood, their surface is smooth, the capsule is thin, opaque, and easily separable; the cortex is more or less dark red, and marked with irregular or mottled white patches. The renal vessels of the Malpighian bodies and those on the surface are also distended. On section the cortical substance is increased in size, and is dotted with dark red points of extravasation; the hæmorrhagic spots are generally scattered throughout the cortex; these dark red points are the engorged Malpighian corpuscles. Often the kidney is pale and mottled owing to the colour of the cortex and of the pyramids; the pyramids are hyperæmic and striped with red. Opaque and bloody liquid is found in calyces and pelvis. The cortex is smooth, yellowish-white, and spotted. Microscope reveals distension of the capillaries, exudation of fibrine, increase of red corpuscles, and increase of detached epithelial cells in the convoluted tubes, which are also dilated. The tubes also contain granular, opaque, and disintegrated cells with exudation matter, and being choked up they compress the renal capillaries. The intertubular stroma is unaffected. Other morbid appearances are due to complications, as hypertrophy or valvular diseases of the heart, and diseases of the lungs.

Causes.

Morbid  
appearances.  
Epithelium.

Kidney large.

Cortex large

Pyramids  
hyperæmic.

Microscope.



## Pathology.

*Pathology.*—It is a catarrhal inflammation of the uriniferous tubes. The exudation takes place into the Malpighian bodies, tubules, and into the connective tissues. At first there is congestion of the organ, and rupture of the capillaries of the Malpighian bodies; this is soon followed by proliferation of the epithelial elements, and their rapid desquamation takes place. These desquamated cells further fill up and obstruct the tubes, and thus the additional abnormal materials are obstructed in the renal capillaries. The kidneys become pale and mottled. The blood now becomes more deteriorated, and is poisoned with excrementitious matters, these effete matters mix with the urine, and the urine is also scantily secreted. The urine contains fibrinous coagula, desquamated epithelial cells, shaped in the form of uriniferous tubes, and known as tube casts; it also contains blood owing to the rupture of blood-vessels, to over-distension, or to paralysis of the vessels, due to the presence of effused products into the blood. The blood in the urine gives the latter a smoky or dark grumous appearance. In this catarrh the increased secretion of mucus or of the epithelial cells is not freely discharged, as is always the case in inflammation of any other mucous surfaces, but as the mucous surface lines the minute complex structure of the uriniferous tubes, the morbid products are generally retained. These products often close up the tubes and further interfere with the functions of the kidneys. Besides, the defective action of the skin also causes its excreta to become accumulated in the blood, and the kidneys therefore having to excrete them suffer still further injury.

## Symptoms.

*Symptoms.*—The invasion is commonly abrupt. A patient takes cold and in a day or two his face becomes puffy, and hands and body swell, or the patient suddenly gets swellings during convalescence from scarlet fever. The chief symptoms are slight fever, pain in the loins, abnormal

urine and dropsy. The disease usually ushers in with chills, sometimes it begins with a rigor followed by heat and dryness of the skin; there is elevation of temperature, the pulse is hard, tongue coated, headache, great thirst, loss of appetite, nausea, and sympathetic vomiting; there is dull aching pain with tenderness in the loins, and derangements of the stomach and bowels. The face soon becomes puffy, and swellings of the connective tissue throughout the body with dropsy soon sets in; hands, legs, and scrotum also swell, and there is effusion (anasarca) of fluid into the serous cavities. If only one kidney be diseased there may sometimes be no dropsy, but there is always fever, the pulse is hard, there is loss of appetite, great thirst, the skin is dry, and there are dull pains in the loins. In acute disease the micturition is frequent especially at night, but the patient notices that his urine is scanty, of a dark smoky colour, often turbid or dark brown from admixture of blood, and only comes in few drops; the total quantity in a day is not above 3j or 3ij. On examination, it contains plenty of albumen; its specific gravity is very high, 1020, is acid, and deposits abundant amorphous urates, and often blood on standing. The quantity of urea and organic salts is less. Under the microscope, urine contains tube casts of coagulated fibrin, epithelial casts, epithelial cells, blood or exudation corpuscles and occasionally crystals of uric acid. Blood corpuscles are abundant in the early stage; sometimes there are amorphous urates and uric acid crystals, and also fatty matter; the tube casts are abundant and of various sizes; they are medium sized and very large, or very small hyaline casts with opaque granular casts. Anasarca is from the first, and appears on the face, eyelids, and conjunctivæ, and over the genitals. In favourable cases the coagula are washed away, albumen is diminished, dropsy becomes less, the skin also becomes moist, and it ends in from eight to fourteen days in recovery. If

Fever.

Pain in loins.

Abnormal urine.

Dropsy.

Favourable cases.

Unfavourable cases.

the disease is extensive, the patient is killed by pneumonia, pleurisy or peritonitis; or the secretion of urine is considerably diminished. Dropsy appears in serous cavities, and often causes difficulty of breathing, and uræmia, with convulsions and stupor, supervenes. There may be formation of a thrombus, or a clot in the pulmonary artery, or intercurrent pneumonia, or œdema of the larynx or of the lungs; but such complications are more common in chronic rather than in acute Bright's disease. Very frequently the acute disease passes into a chronic form. In some cases anasarca is the first symptom of the disease; in others growing anæmia and weakness without any apparent cause lead to the detection of acute Bright's disease.

Chronic form.

Very frequently the acute disease passes into a chronic form. In some cases anasarca is the first symptom of the disease; in others growing anæmia and weakness without any apparent cause lead to the detection of acute Bright's disease.

Terminations

*Terminations.*—In some cases recovery takes place within a week or two or at a later period, very often acute cases end in chronic form, and these are incurable. Occasionally they end in death.

Diagnosis.

*Diagnosis.*—In acute Bright's disease there is presence of blood and free epithelium in the urine, absence of any degeneration, and absence of long-standing complications. The presence of undue exposure or scarlet fever will determine the diagnosis.

Prognosis.  
Favourable.

*Prognosis.*—Increased discharge of urine, diminution of blood and albumen, abatement of fever and swelling of the body and face becoming florid and healthy are favourable signs. If with these favourable signs the albumen in the urine continues unabated the disease may probably merge into a chronic form, or the disease may recur. If the urine steadily decreases in quantity and contains abundant albumen, epithelium and tube casts, the prognosis is serious, and if with these œdema of the lungs or glottis, or signs of uræmia set in, death is certain to follow. The disease is more favourable in the aged than in the young.

Unfavourable

urine steadily decreases in quantity and contains abundant albumen, epithelium and tube casts, the prognosis is serious, and if with these œdema of the lungs or glottis, or signs of uræmia set in, death is certain to follow. The disease is more favourable in the aged than in the young.

Treatment.

*Treatment.*—The patient should be confined to bed and covered with flannel. The inflammation subdued by leeches

or cupping in the loins, followed by poultices. Induce perspiration and relieve overloaded tubes by diaphoretics and warm baths. Promote the secretions of the liver, skin, and lungs. The patient should take large quantities of liquids. Diaphoretics, and salines and purgatives should be administered. The powerful diuretics are generally irritating to the kidneys, and therefore are both useless and unnecessary. Those which promote the secretion of urine and thereby remove the casts which block up the tubules should be used. Digitalis is good for this purpose. The fever having subsided improve the quality of the blood, and thus diminish the albumen. For this purpose iron is recommended; it is the best diuretic and tonic. Diet should be nutritious and easily digestible. The patient must avoid exposure to cold and damp, and wear flannel next to the skin for a long time.

Large quantities et liquid.

Digitalis.

Iron..

## CHRONIC BRIGHT'S DISEASE.

Chronic Bright's disease.

*Parenchymatous or interstitial nephritis* presents three varieties which may roughly be distinguished by symptoms during life, and accurately by the appearances of the kidney post mortem. The forms of kidneys are three: 1, large, pale; 2, small, red; 3, amyloid. It may be an independent affection or may be a termination of the acute. The three forms of kidney are accompanied by tolerably distinct symptoms, so that they can usually be distinguished during life. The urine is altered in quantity and quality, there is presence of albumen in the urine, a tendency to dropsy and to various secondary tissue degenerations. The cells of epithelium and of urinary tubules at first increase in bulk, through imbibition of an albuminous liquid. Their contents then undergo fatty metamorphosis. Thus, the epithelial cells become changed into fat granules. Finally, the cell-membrane perishes and the fat globules

Urine.

Epithelial cells.



emerge free into the uriniferous tubules. In most cases coagulating exudations are also formed in the tubules, and there may be proliferation of the interstitial connective tissue.

Atrophy of kidney.

Atrophy of the kidney which sets in after is a necessary consequence of the inflammatory process.

Causes.

*Causes.*—Where acute Bright's disease has not laid the foundation of the cardiac disorder. Is common as in advanced life, and most often in men. May be due to exposure to damp and cold, to the abuse of diuretics, as cubebs, and to spirits. Is common in constitutional disorders, as gout, rickets, syphilis, scrofula, malaria, and other dyscrasia. It is often associated with tedious suppuration, as caries and necrosis of bones.

Symptoms.

*Symptoms.*—In a variety of cases the disease soon sets in after an acute attack. In some it may be latent until revealed by uræmic symptoms. In rare instances there may be only albuminuria or slight dropsy.

Large white kidney.

*Large white kidney. Chronic parenchymatous nephritis.*—

Kidneys large.

In this affection there is increased development of the epithelium lining the convoluted tubes. The kidneys are very large, hyperæmic, and infiltrated, often stellate, conspicuous blood-vessels are seen on its smooth or white or mottled surface. The capsule is easily separable, which is somewhat thin and opaque. On section the cortical portion appears considerably thickened, the colour waxy white, or yellowish, or homogeneous white and opaque, and present numerous yellow streaks due to fatty degeneration, hence often erroneously called *fatty kidney*. The normal striated appearance being altogether absent, the pyramids are pink, and present a marked contrast to the pale colour. The epithelium is little changed. Uriniferous tubes contain cylinders of infiltration. Its consistence is much diminished. The Malpighian bodies are of natural appearance, but the epithelium of the cortex is swollen and granular. Under the microscope the uriniferous tubes are enlarged, contain-

Surface mottled.

Capsule separable.

Cortex thick and waxy.

Pyramids pink.

ing exudation corpuscles, epithelial particles, cells more or less opaque and granular, oil-globules and fat. Some contain hyaline fibrinous casts. The intertubular substance is unaltered. As the disease progresses the distended tubes and their contents are broken up into granular *débris*, and afterwards absorbed. The Malpighian corpuscles are slightly enlarged, and their capsules are thin. The kidneys remain large and smooth to the last. These changes are brought about by the destruction and gradual absorption of the distended tubules and their epithelial contents. The cortical substance is also destroyed, and the whole organ undergoes amyloid changes. This is a common result of cold and not of scarlatina.

*Symptoms.*—The disease generally follows an acute disorder; the invasion is sudden, or may follow repeated pregnancies, or exposure to cold; it occurs under thirty years of age. 1. Dropsy or serous effusion is a most common symptom, the face is pale, puffy, and pasty, and the skin smooth, white, and glossy. 2. There is tendency to secondary complications, as pneumonia, peritonitis, to uræmic poisoning and convulsions, but less to valvular disease and hypertrophy of the left ventricle. 3. Urine is generally scanty, its specific gravity either normal or somewhat raised; it is pale, cloudy, or somewhat smoky, on standing it deposits amorphous renal *débris* and casts of tubes, these are epithelial, granular, fatty, or hyaline casts. The duration is shorter than when the disease is granular. Death often occurs within six months, recoveries are only for a time and relapses occur; where albumen totally disappears from the urine permanent recovery may ensue. Symptoms.

*Small, red, or granular contracting kidney (interstitial nephritis).*—*Causes.*—Intemperance, gout, repeated exposure to cold, and fatty degenerations elsewhere are its causes. Granular contracting kidney. Causes.

Morbid  
appearances,  
Small kidney.

Capsule  
adherent.  
Lobular  
kidney.  
Cortex  
atrophied.

Whole organ  
destroyed.

Pathology.

Cysts.

Symptoms.

*Morbid appearances.*—The kidney is diminished in size and weight ; its surface is smooth and presents depressions and elevations ; the capsule is opaque, thick, and firmly adherent to the subjacent surface, giving the gland a lobular appearance. On section the cortex is atrophied and forms a thin rim around the bases of the pyramids ; it is of a brownish colour and granular in texture, the whole being tough and firm. Under the microscope the secreting structures are extensively destroyed, the Malpighian bodies reduced in size and are crowded together, the uriniferous tubes are altered, some are merely thread-like and denuded of epithelium, some contain only few fibrous cylinders, others only scattered, disintegrated epithelium. The whole organ is disorganised. Some portions may be healthy in some cases.

*Pathology.*—Some believe that the mischief begins in the epithelial cells, others in the intertubular substance. In every case there is hypertrophy of the fibrous stroma, and by the pressure and contraction of this fibrous material the uriniferous tubes and Malpighian bodies are compressed and destroyed, and the kidney is reduced in size. Where the fibrous material penetrates the surface it presents depressed points, which when numerous appear as superficial granulations. The disease extends from the surface inwards, and into the pyramids. The development of cysts is common in this form of Bright's disease. These cysts are of varying sizes, and are due to obstruction of the tubes with exudation, or to their interrupted contraction by fibrous material ; the spaces left between the tubes thus becoming dilated.

*Symptoms.*—These cases are chronic from the first ; they commence insidiously without any cause. Dropsy is altogether absent in a majority of cases, or is only slight and limited to the ankles, legs, and eyes, it disappears and returns after a time. The disease lasts for years ; is often

associated with cachexia. There are no serous complications as in smooth white kidney. It is complicated with hypertrophy of the left ventricle, atheroma of arteries, and apoplexy. In many cases the patient becomes thin and emaciated without any obvious cause, has loss of appetite occasional nausea and vomiting, also suffers from dyspnœa and palpitation of the heart, his sight is impaired, and has frequent micturition at night. In these cases the urine is abundant, of a light colour, and of low specific gravity, 1010-or 1012, with little or no albumen and little urea. There are very few casts, if any, chiefly hyaline, also granular casts with traces of epithelium or fat. Occasionally towards the termination the urine becomes scanty, smoky, and of high specific gravity. As a rule blood is absent, but it may contain blood owing to the supervention of an acute attack. Dropsy in this form is generally absent or only observed at intervals, and then begins as anasarca. The arms, abdomen, and scrotum swell, the health and strength suffer, later on the skin becomes pale, anæmic, harsh, and dry, and in several cases there is a marked constitutional cachexia with dyspepsia, and tendency to gastric or cerebral hæmorrhages or to epistaxis. The vision is so very much impaired, as to cause total blindness. Under the ophthalmoscope we notice effusion of serum into the retina and in the neighbourhood of the disc, also degeneration of the retinal vessels leading to numerous spots round the optic disc.

Hypertrophy  
of left  
ventricle.  
Atheroma of  
arteries.  
Apoplexy

Urine  
abundant.

No albumen.

Blood absent.

Dropsy.

Cachexia.

Blindness.

*Amyloid degeneration. Waxy or lardaceous kidney.*— Amyloid degeneration.

Is associated with amyloid disease of other organs, as the liver or spleen, or may occur independently. During health a small quantity of fat is always found in the epithelial cells of the kidney, but in this disease the fat is abnormally increased. The degeneration leads to destruction of the secreting tubes and cells. It commences in the Malpighian



bodies and small arteries, and is followed by transudation of fibrin into the tubes.

**Causes.**—Amyloid disease of the kidney is usually associated with chronic suppuration elsewhere. Thus, it is associated with ulcerative phthisis, with caries, and with syphilitic ulcerations. It must, however, be borne in mind that suppuration should not necessarily exist, for a hydatid of the liver which has suppurated and dried up has been known to have accompanied amyloid disease.

**Post-mortem appearances.**—The kidney is large, firm, pale, and increased in weight; the capsule peels off readily; the cortex is bloodless, is white or yellowish in colour, and has a waxy appearance. The pyramid is tough and hard; the secreting structure is lost.

**Pathology.**—It is the result of acute inflammation of the kidney, or of a fatty degeneration of the large white and smooth kidney. In this condition the tubes of the kidney are choked up with oil granules.

**Symptoms.**—The disease is insidious. For years there is gradually increasing debility; feeble, frequent, and easily compressible pulse; pallor and puffiness of the face; frequent micturition, oftener at night. The urine is increased in quantity; from the first it is of low specific gravity, and is very pale; urea is less, it contains hyaline casts, and albumen is slight. The odour of urine in these cases resembles that of urine passed after a dose of cubebs. There are dyspeptic derangements, tendency to inflammation of the serous membranes, and occasionally to amaurosis. There is little tendency to uræmia and convulsions. **Anasarca common.** Anasarca of the limbs and dropsy of different cavities are common. Dropsy appears from the first. As the disease advances the urine becomes less in quantity, its specific gravity becomes high, and the albumen abundant. In these respects the symptoms are alike those of granular kidney, but in this affection the heart is not hypertrophied,

and the pulse is not heaving. Under the microscope we find numerous granular casts mixed up with a considerable number of oil-globules.

*Complications of chronic Bright's disease.*—1. Chronic œdema of the lungs is common, and causes dyspnœa and a cough. 2. Cardiac hypertrophy of the left ventricle. 3. Pericarditis. 4. Morbid condition or thickening of the walls of small vessels, leading to apoplexy. 5. Uræmia, which often does not occur. The symptoms of uræmia sometimes develop rapidly, sometimes slowly. Headache, apathy, and vomiting are warnings. Fits are generally followed by coma, with stertorous breathing. The symptoms of uræmia may pass off. Some think it due not to blood poisoning, but to œdema of the brain. At any rate it occurs in four cases—1. When seizure is a deep coma, with intercurrent spasm. 2. When urine is at times normal or increased. 3. During marked œdema of the face. 4. When during the attack the carotids pulsate strongly.

Complications of chronic Bright's disease. (Edema of lungs. Hypertrophy of left heart. Pericarditis. Cerebral apoplexy. Uræmia.

The changes in the heart and blood-vessels vary with the intensity and the length of time the disease has lasted. The cause of hypertrophy of the left ventricle is said to be an altered condition of blood in Bright's disease. That this altered blood exercises an undue action upon the heart, that such blood having to pass through diseased vessels, the heart has to work with increased vigour, and it therefore becomes hypertrophied. Some are of opinion that the blood containing morbid materials increases the arterial tension, and thus the muscular coat of the heart becomes hypertrophied.

Cause of hypertrophy of heart.

*Terminations.*—Death takes place from complications similar to those in the acute form, from laceration of the diseased vessels, or from hæmorrhage into the brain. The hæmorrhage may be owing to cardiac hypertrophy, to contraction of the small vessels, or to increased blood-pressure

Terminations.

on them. There are also degenerative changes in other organs, and death may result from those degenerations.

Diagnosis.

*Diagnosis.*—The difficulty lies in distinguishing acute and curable cases from those of chronic diseases. In chronic disease the affection is insidious, and is often complicated with chronic phthisis, chronic suppurating diseases, constitutional syphilis, enlarged liver or spleen, or hypertrophy of the left ventricle. If with an acute attack albumen continues even though other symptoms have subsided, the chronic disease may be present. If with albumen blood-corpuscles and epithelial elements are also found in the urine, the disease shows the declining stage of the acute, but if there be no blood and no epithelial casts, the case is certainly one of chronic Bright's disease.

Prognosis.

*Prognosis.*—The prospects are gloomy. The structural changes are such as cannot be repaired. There is a low plastic exudation, and the tubes are shrivelled up into thin fibres. As the disease progresses these changes grow more and more, involving other portions of the kidney, blood becomes contaminated with excrementitious matters, and at last a limit is reached, when death results. Cases may be prolonged for years, and under care and proper attention considerable hope may be entertained. *Unfavorable* cases are those where the disease is of long duration, the skin is dry, urine much altered in quantity and quality, and there are existing complications. In such cases, urine, which has previously been abundant, becomes steadily scantier, although the specific gravity may continue the same, and there is persistent fever. Fatal cases are those where pneumonia or pericarditis, or suppression of urine or vomiting or diarrhoea supervenes upon the previously existing unfavorable signs.

Treatment.

*Treatment.*—Indications are three. 1. Prevent, if possible, further extension of the mischief. 2. Prevent complications. 3. Remove urgent symptoms, as anæmia,

dropsy, diarrhœa, dyspepsia, &c. Find out the cause and remove it. Avoid intemperance and long-continued exposure to cold. When due to gout treat it by suitable means. Eliminate effete products from the blood through the skin, liver, lungs, and bowels, and give squills, juniper, or nitric ether. For dropsy purgatives are very useful. If there be much depression or serous diarrhœa, alcohol may be given. The diet should be generous, eggs, beef tea, and milk, should be freely given to counteract the loss of albumen. Quinine and iron are good tonics. Turkish baths and hot vapours are recommended. The patient should always wear flannel next the skin and avoid damp. Should not go out at night. Change of air and sea-voyage specially are recommended.

## DIAGNOSIS OF DROPSIES.

<i>Renal.</i>	<i>Cardiac.</i>	<i>Pulmonary.</i>	<i>Hepatic (Ascites).</i>
First in the eye-lids. Begins in the face. Extends in upper limbs. Ultimately feet and serous membranes. Rapidly appears and disappears. Relapses frequent. Surface of skin dull and pasty looking.	Begins in lower limbs. Extends upwards and becomes general.  Slowly and gradually appears and disappears. Relapses frequent. Skin shining and tense.	Begins in lower limbs. Extends upwards and becomes general.	First confined to abdomen. Only portal system involved. Limbs affected very late.

## DISEASES OF THE PELVIS AND URETERS.

Diseases affecting pelvis of the kidneys and ureters are—1. Pyelitis. 2. Dilatation of the kidneys. 3. Carcinoma and tuberculosis. 4. Renal calculi and colic.



## Pyelitis.

*Pyelitis*.—The inflammation is confined to the pelvis and calices of the kidney. It may be acute or chronic, and may involve both organs or be confined to one. Rarely pyelitis of the kidney is the seat of croupous or diphtheritic inflammation. This occurs in typhoid stage of cholera.

## Causes.

*Causes*.—1. Catarrhal pyelitis is generally caused by renal calculi; rarely by irritants, as turpentine and cantharides. 2. A common complication of Bright's disease. 3. Is often associated with pregnancy and other morbid states of the blood. 4. Morbid growths, as tubercles, cancer, hydatids, or blood clots. 5. The decomposition of urine in the pelvis and its stagnation from obstruction of the ureter. 6. Extension of gonorrhœa or inflammation from the bladder up the ureters to the kidney, leading to most severe forms of pyelitis. 7. Exposure to cold and wet. 8. Embolism of small arteries of the kidney.

Post-mortem  
appearances.  
Kidney large.

*Post-mortem appearances*.—In recent cases the kidney is enlarged, its vascularity increased; the mucous membrane is reddened by injection, or even by ecchymosis; the capsule is easily separable; the structure is undisturbed. There are slight extravasations, with softening of the epithelium and discharge of mucus or pus, and sometimes of blood from its cut surface. In severe and long-standing cases the

## Kidney a sac.

kidney is merely a sac. The mucous membrane has lost its redness, is pale, often swollen and discolored with sometimes a deposit of urates, and is much opaque and firm. It is covered by exudation, or converted into diphtheritic eschars, which on separating leave irregular losses of substance. The pelvis is dilated, its walls are thickened, and often there is atrophy of renal parenchyma. The substance becomes brown or grey, and spots of suppuration are found. Pus is constantly formed, and if prevented from escaping through the urethra it collects into the pelvis of the kidney and is mixed with urine. By degrees

the substance of the kidney is compressed, its papillæ flattened or obliterated, until it is completely destroyed, leaving a mere sac containing pus. Very often the pelvis may be shrivelled up and the ureter obliterated. The pus thus mixed in the urine renders the urine ammoniacal. In rare cases the impacted ammoniacal urine throws down a copious deposit of phosphates, which thus thickens the contents of the sac into a mortar-like substance. In other instances, the pus is thickened and forms calcareous deposits. When the disease is due to the lodgment of a calculus, or a blood clot, there are ulcerations and even perforations into the intestines or into the peritoneum, with effusion of pus into the surrounding cellular tissues. Pus often escapes externally, as if from an ordinary abscess into the loins. Where the pus and urine fail to find an exit owing to the ureter being blocked up by a calculus or a clot of blood, the inspissated pus, or tuberculous or cancerous deposit in the pelvis accumulates behind the obstacle and forms an abscess-like cavity called, *pyonephrosis*. The matter so confined may ultimately open in any direction.

Pus.

Pyonephrosis.

*Symptoms.*—The disease is rarely found out during life. Symptoms are those of the primary lesion and of the inflamed pelvis and calices. Acute catarrh may begin with a rigor, and be attended by fever and local pain and tenderness in the renal region. The pain is shooting in all directions, often to the testes, and there is irritability of the bladder with scalding and frequent micturition. If inflammation be severe there may be vomiting. The most important symptoms are found in the character of the urine. In the early stage it is increased in quantity, turbid, is generally acid, may contain little blood, or be intimately mixed with mucus and epithelium cells, detached from the inflamed pelvis. The cells are irregular, spindle-shaped, three-cornered. As the case advances urine is

Symptoms.

Pain.

Urine.

mixed with pus. Turbid at first and then limpid urine indicates a calculus in the kidney. In such cases urine soon becomes decomposed and ammoniacal, and also deposits phosphates. When limpid the urine is solely from the healthy kidney, and if examined it does not contain renal casts.

**Obstruction.** Where the obstruction in the ureter takes place the urine mixed with pus accumulates in the pelvis of the kidney, and forms an elastic fluctuating tumour, and the local symptoms are intense. The stoppage may persist for a few days or for a few weeks, and the local symptoms are followed by disorder of the alimentary canal, as nausea, vomiting and diarrhoea. When suppuration has set up, hectic fever appears. Chronic cases may lead to marasmus, dropsy, and death. Stone variety leads to exacerbations, especially after any jolting of the body. If one kidney is only affected the disease lasts for a very long time without any serious impairment of health, even though the kidney may be totally disorganised. In a few cases the abscess may cause death by exhaustion, or by degeneration, or by supervention of complications. Violent pain in the back, difficulty of movement of the spinal column, rigors, and aggravation of fever, indicate threatening perforation.

**Perforation.** Perforation leads to perinephritis followed by peritonitis. In perforation into the intestine pus may pass by stools, and recovery follows. Where both kidneys are diseased the chances of recovery are far remote. In these cases there is more or less retention of urea in the blood. The patient soon presents typhoid symptoms and becomes delirious. The disease is complicated with convulsions and coma.

**Diagnosis.** *Diagnosis.*—Pyelitis in the early stage is known from pus from the bladder or urethra by the characteristic groups of flat, spindle-shaped cells in the urine. In advanced cases pus is discharged with acid urine, and signs of diseases of the bladder, urethra or prostate are absent. Tenderness in the loins confirms the diagnosis.

In pyelitis, when complicated with diseases of the bladder, urethra, or prostate, the diagnosis is often a point of uncertainty, but if the quantity of pus passed every day be very great, if the urine is only feebly decomposed, the loins are painful on pressure, and there is fever with emaciation, we may approach to a clear diagnosis.

*Prognosis* varies with the disease, as affecting one or both kidneys, and also with the cause. Where both kidneys are affected, the disease is usually fatal. Where only one organ is diseased, the other acts more vigorously and thus compensates for the other, even though the latter may be completely destroyed. Cancerous or tubercular pyelitis is invariably fatal. It is equally serious if associated with chronic diseases of the bladder, urethra, or prostate. In cases of calculi or hydatids, the prognosis is somewhat favorable. Recovery, as a rule, follows in cases due to zymotic causes. The rupture of the dilated sac into the abdomen is fatal, if the sac opens externally it is a favorable sign. Prognosis.

*Treatment.*—Find out the cause and remove it. If due to retention of urine from any cause relieve it, and wash the bladder with antiseptics. If due to stone try and remove it. Rest, use of hip-baths and poultices to the loins, often cuppings over the kidney, or ice-bags are useful. Pain may be relieved by opium or subcutaneous injections of morphia. Moderate purgatives and unirritating diaphoretics are very serviceable. The patient should be kept warm in bed and fed on light nutritious diet. Avoid salt food and drink. In extreme prostration, or where abscess is threatening, give mild nutritious diet and bark and ammonia to promote suppuration. The bladder should be freely washed to avoid irritation of pus. If the disease affect one kidney, the patient should take plenty of liquids to keep the urine diluted. To diminish pus try copaiba. Give *Liquor Calcis Lactis* freely. Treatment.



## HYDRONEPHROSIS.

Dilatation.

*Dilatation of the pelvis of the kidney* with atrophy of the renal substance resembles cysts formed in the ovaries. It varies in size from a small almond to a fist, and contains yellowish serum and a gelatinous substance, which yields albumen. When an obstruction to the flow of urine occurs, at first the urine distends the parts above, and thus the portions of the ureter and pelvis of the kidney are dilated, after some time the dilation is followed by narrowing, with atrophy of the renal substance.

Causes.

*Causes.*—May be congenital. Closure of the ureter by impaction of a stone, or more often by pressure of a tumour on the ureter causes it.

Morbidity  
anatomy.

*Morbidity anatomy.*—In milder degrees of hydronephrosis the papillæ are shrunk, hardened, and leathery. The renal substance is tough, much diminished in bulk, and may be reduced to a membranous sac. The ureter may be equal to small intestine in calibre. Dilatation cannot be detected where only one ureter is involved. Generally one organ becomes affected, the other being compensatorily hypertrophied. In such incomplete obstruction the renal elements still secrete urine, but the urine is less rich in solid constituents. It is pale, watery, of low specific gravity, and without albumen. In advanced cases it is charged with decomposing blood and pus. It often contains urea, uric acid, and earthy and alkaline salts.

Symptoms.

*Symptoms.*—If the sac be small and the other kidney sound, there will be no symptoms during life, as only one ureter is involved. If the sac be inflamed there will be rigors. If the distension be very great, there will be noticed a palpable tumour in the abdomen and of an enormous size. The renal tumour is known by being painless, situated in the flank in the lumbar region and

close to the spine, it extends upwards to the hypochondrium and downwards to the ileum in front. The colon is usually in front of it, and small intestines are pushed laterally. In hydronephrosis the tumour has a soft undulating feel, and is distinctly lobulated. Does not change its position with respirations. Often lessens with the sudden discharge of a large quantity of urine. When due to impaction of a stone, there is also nephritic colic.

*Terminations.*—The obstacle may be dislodged completely, and recovery follows. If the tumour be of long standing it shrivels up into an empty sac. Death often occurs from pressure of the sac on important organs, or from suppression of urine. Terminations.

*Diagnosis.*—*From ovarian cysts, ascites or hydatids.*— Diagnosis.  
In hydronephrosis the colon is in front of the swelling. Absence of colon in the corresponding region distinguishes it from an ovarian cyst. Ovarian cysts.  
From *ascites* by the presence of dulness in both flanks. Ascites.  
In hydronephrosis the dulness is fixed, and limited although the position of the patient be changed. In cases of *hydatids* parasites are found in the urine, and also there may be detected hydatid fremitus. Hydatids.  
Hydatids seldom attack both kidneys, hydronephrosis often.

*Prognosis* is grave ; when unilateral it may last for years Prognosis.  
If both organs are involved the case is very serious.

*Treatment.*—The patient should take plenty of liquid to keep the urine very diluted. As the swelling is painless, it can be well manipulated with some oil or lubricating ointment, and if not relieved cupping may be tried. Treatment.

*Suppurative nephritis. Phlegmonous abscess.*—*Causes.* Suppurative nephritis.  
—Abscess in the substance of the kidney occurs when the inflammation runs on to suppuration. May be due to wounds and contusions, collection of urine in pelvis of the kidney, propagation of inflammation from the urinary passages to the kidney, septic materials in the blood, embolism of small arteries of the kidney. These cases Causes.

are often mistaken for distended pelvis, and their ultimate sacculation.

Phlegmonous abscess is generally confined to one kidney, and may also be due to inflammation round a calculus in the kidney. The abscess may open into the pelvis, and its contents discharged by the ureter, or may open into the loins. It rarely opens into the colon or the duodenum, when it does it causes sudden death.

Treatment.

*Treatment.*—When there is clear indication of an abscess having formed in or around the kidney, a free opening should be made in the lumbar region, and thus further extension may be avoided, and a cure effected. Pain may be relieved by hyoscyamus, belladonna or hydrate of chloral. Vegetable bitters, iron and cod-liver oil, are useful, and if the urine be alkaline nitro-muriatic acid may be given. To diminish the quantity of pus copaiba may be tried, and lime water and milk may be given often.

Renal embolism.

*Renal embolism.*—The fibrinous vegetations in valvular diseases of the heart may often be dislodged, carried into the circulation, and impacted in the kidneys. Such emboli obstruct renal circulation, interfere with its nutrition and functions, cut off arterial supply of a considerable portion of the kidney, produce intense hyperæmia of the surrounding parts, and lead to rupture of the Malpighian capillaries and to effusion of blood into the surrounding tissues. Thus, wedge-shaped yellow deposits, surrounded by red areolæ, are formed. They give rise to temporary albuminuria, or to suppurative nephritis.

#### MORBID GROWTHS.

Cancer of the kidney.

*Cancer of the kidney* may be primary or secondary to cancer of some other organs. Primary cancer is characterised by a course of cancerous cachexia, and always ends in death.

Causes.

*Causes.*—Is more common in men than in women.

Primary cancer occurs in children under ten years of age. It is also a disease of advanced life.

*Varieties.*—The encephaloid or fungus hæmatodes is Varieties. most common, and is always attended with hæmorrhage from the kidneys. Very often in post-mortem of such cases a large quantity of blood clots with cancerous matter have been found within the tumour. This variety occurs in two forms, nodular and infiltrated. It begins in the cortex, and ultimately extends to the pyramids. In the cortex it first invades the epithelium, and then spreads into the connective tissue. The infiltrated variety is smooth on the surface. The nodular form is irregular. Cancerous kidney often attains a very large size, and may weigh several pounds. The surface is smooth, and here and there lobulated, and in certain places it has a soft feel. The cancer is subject to degenerations, softening, suppuration, and hæmorrhage. Very often it forms extensive adhesions with the surrounding parts. On opening the abdomen the colon is generally found in front of the growth, other organs being displaced, thus in cases of affection of the right side the liver, and of the left the stomach, are pushed out of their position. In some cases the growth extends into the pelvis, and also blocks up the ureter. The disease seldom affects both sides, and is often associated with secondary deposit in the liver, lungs, and mesenteric glands.

*Symptoms.*—There are two pathognomonic symptoms of Symptoms. primary cancer. These are—a tumour in the abdomen and hæmorrhage. The *tumour* appears in front between the margins of the ribs and the ileum. In some cases it fills nearly the whole of the abdomen. The colon generally lies in front of it, and over that portion percussion is resonant, in all other parts it is dull. On palpation the growth is smooth and lobulated, with irregular margins. Sometimes the tumour feels soft and sacculated. It is fixed



in its position. *Hæmorrhage* is irregularly intermittent, and often recurs. Generally it is moderate, sometimes it is insignificant. Urine contains albumen, and very often epithelium from the pelvis and ureter, mixed with blood. The presence of cancer-cells, if detected, is quite diagnostic, but it is extremely difficult to find them for three reasons: 1, the cancer-cells very much resemble the epithelial cells of the pelvis or ureter which are always found in such urine; 2, the cancer cells on their way to the urine are broken down and degenerated; and 3, the urine itself has a further degenerative action on the degenerated cells. Pain in the loin is generally present; it is generally paroxysmal and shooting in different directions. In other cases the tumour causes inconvenience only by its weight and size. Derangements of the stomach and loss of appetite are often noticed from the first. Patient becomes emaciated, and has a faint yellowish discoloration of the surface. In advanced cases pressure on the inferior venæ cava causes œdema of the limbs and face. Ultimately exhaustion sets in and patient dies.

Pain.

Duration.

*Duration.*—The disease often lasts for one or two years.

Diagnosis.

*Diagnosis.*—There is a tumour in the flank, but it may be enlarged liver, spleen, ovary, or uterus, may sometimes be ascites or aneurysm of the aorta.

Treatment.

*Treatment.*—Relieve the symptoms. Opium may be tried.

Tubercles of the kidney.

*Tubercles of the kidney*, when present, give rise to tuberculous pyelitis. The disease may be primary or secondary. The acute form runs a very rapid course, and generally ends in death. The secondary is a part of general tuberculosis, and occurs in the course of tubercles in the lungs or intestines. The secondary tubercles are rarely known during life, although more often seen on post mortem in children than in adults.

Causes.

*Causes.*—History of tuberculosis and exposure to cold are its causes. May occur at any age.

*Post-mortem appearances.*—The deposit often begins in the cortex and extends to the urinary passages, or may begin in the pelvis and then extend upwards and downwards. The deposit beginning in the cortex consists of yellow miliary tubercles, which soon coalesce and form masses of crude tubercles, and then extend to the pyramids. These ultimately soften down and form abscesses, which burst and are discharged with the urine as pus and tuberculous detritus. The deposit of tubercles in the pelvis or ureter at first invades its submucous surface and forms a granular, rough, opaque layer. This layer soon disintegrates, the surrounding mucous membrane is also destroyed, and forms a slough which is discharged with the urine mixed with pus and blood. Where the ureters are completely blocked up by tubercles, pyonephrosis with dilatation of the kidney, and extensive destruction of the renal structure, result. Sometimes a mere sac of the kidney remains. Where the ureter is partially open the kidney retains its own size, or may become somewhat contracted. Tubercles often invade both kidneys; rarely run an independent course.

Post-mortem appearances.

Deposit in cortex.

Deposit in pelvis.

Deposit in ureters.

*Symptoms* are those of chronic pyelitis and of chronic inflammation of the bladder. There is at first a dull pain in the lumbar region with frequent micturition. The urine when passed is often smoky. As the disease becomes established the urine contains pus and tuberculous *débris*, sometimes blood. Under the microscope there are blood-corpuscles, pus-corpuscles, a number of oval-tailed cells from the bladder, granular detritus, masses of softened tubercles, and shreds of elastic tissues and fibres. The urine if tested is feebly acid and albuminous from the presence of pus. As the case progresses emaciation follows, there is hectic fever with chills, and pains in the loins and in different parts. The kidney in some cases becomes sacculated, and is very painful. Where the ureter is blocked up with tubercles, pus in the urine becomes less, kidney

Symptoms.

increases in size, and with it the pain is also increased. Very often the obstruction in the ureter becomes less complete, the pus reappears in large quantity, the tumour becomes diminished and the pain is lessened. In advanced cases the lungs and intestines also become implicated. There is cough, dyspnœa, and also diarrhœa. Where both kidneys are affected the symptoms of uræmia set in. Usually death occurs from exhaustion, from profuse supuration, or from complications, as phthisis or diarrhœa.

*Duration.* *Duration* varies from two or three months to two or three years.

*Diagnosis.* *Diagnosis.*—The existence of signs of chronic pyelitis with evidences of tubercles in other parts without any known cause of pyelitis, as calculus, hydatids, &c., is characteristic of tubercles in the kidneys. Examination of urine containing pus, granular and tuberculous matter (insoluble in acetic acid) and shreds of connective tissue and cast off disintegrated mucous membrane with rapid emaciation, confirm the diagnosis. If phthisis or ulceration of the bowels exists, the diagnosis is most confirmatory. From cancerous pyelitis it is known by the characters of the urine. In cancer the urine is bloody rather than purulent. In tubercles it is wholly purulent, or only slightly bloody.

*Prognosis.* *Prognosis.*—Where tubercles are confined to one kidney the prospects are less serious than when both organs are involved. Where the urinary passages are free from tubercles there is also less danger.

*Treatment.* *Treatment.*—The same as of tuberculosis generally. Strength is to be supported by cod-liver oil, tonics, good diet and stimulants. Pain may be relieved by sedatives. Secretions of pus may be checked by tincture of iron.

*Entozoa.* *Parasites.* — These are — 1. Hydatids or *echinococcus hominis*. 2. Bilharzia or *distoma hæmatobia*. 3. *Strongylus gigans*. 4. *Pentastoma denticulatum*. 5. *Filaria sanguinis*.

1. *Hydatids*.—Are less frequent than in the liver; one kidney alone is generally affected. In structure they resemble hydatids of the liver. *Causes*.—Are common in Europe, but rare in India; Iceland is said to be most infected with them. The parasite is said to be infected from excreta of dogs, which foul the dried fish in that locality. *Symptoms*.—A renal tumour irregularly rounded and lobular, of an elastic feel, is felt in the loins. The parasites by their presence set up inflammation and ulceration, and thus escape through the ureters. They give rise to severe colicky pain, often of an intermittent character, followed by pain at the end of the penis, and frequent micturition. The urine if examined is found to contain pus, blood, and vesicles, and remains of parasites. The parasites resemble *tænia echinococcus* as seen in the liver. When suppuration takes place in the cyst the case resembles one of an abscess of the kidney. *Post-mortem appearances*.—The left kidney is more often affected. The cysts are generally found between the capsule and the gland, they encroach upon the renal tissue, and ultimately lead to its total destruction. If cysts appear as a rounded tumour on the surface of the organ they open into the pelvis and are discharged by the ureter, but when they exist in the cortical portion they remain latent for years before they burst into the infundibula, or open externally. The cysts very often suppurate or contract adhesions with surrounding parts and perish, and the entozoa may thus become destroyed. In such cases the liquid portion becomes absorbed or the whole dries up, forming a pultaceous mass. Prognosis is favourable, as the hydatids are generally discharged by the ureters. *Treatment*.—Oil of turpentine is the best remedy; other means may be tried, as anodynes to relieve the pain, warm baths and diluents to free the flow of urine.

2. *Bilharzia*.—Parasites also found in the kidney, they infest the small vessels of the urinary organs, and the renal mucous

Hydatids.

Bilharzia.



membrane; these worms when inflamed discharge mucus, blood, shreds of tissue and ova. The worm is bisexual and only about quarter of an inch in length. They are the cause of endemic form of hæmaturia so common in Egypt. Are said to enter the system by being swallowed with the food.

*Symptoms*.—Severe intermittent hæmaturia, without any apparent cause, sometimes noticed in Bombay, is the first symptom. The worm sets up irritation and inflammation ending in suppuration, very often it forms a nucleus for the formation of a calculus in the kidney, often it causes great debility and anæmia; when it obstructs into the ureter or into the pelvis, it leads to hydronephrosis or pyelitis. *Treatment*.—Nothing special can be done. Turpentine, male fern, and salines are recommended. 3.

*Strongylus*  
*gigans.*

*Strongylus gigans*.—This parasite is rare, said to resemble *ascaris lumbricoides* in the intestines, is a nematoid worm, and has six nodular papillæ about the head, is very large. Found in North America in dog, ox, and horse. 4. *Pentastoma denticulatum*.—Is also rare, and is described as devoid of sexual organs, is only one sixth to one eighth of an inch in length, and has a double pair of hooks. Is common in ox, and goat's livers. 5.

*Pentastoma*  
*denticulatum*

*Filaria*  
*sanguinis*  
*hominis.*

*Filaria sanguinis hominis* are found in India, in patients suffering from chyloserous urine. In such patients persistent diarrhœa, with elephantiasis of the scrotum and legs are found.

Deformities  
of the  
kidneys.

### DEFORMITIES OF THE KIDNEYS.

These are divided into four varieties. 1. Of position, as moveable kidney, or fixed kidney. 2. Of form, horse-shoe kidney—*i. e.*, union of two. 3. Of number, absence of one kidney the other hypertrophied, and does work for both. 4. A deep kidney. All these deviations from their normal seat, form, and number, may be con-

genital or may be acquired in after life from some accident or disease.

*Causes.*—Is more common in women than in men, and on the right side than on the left. It is of common occurrence at the child-bearing period. Difficult labours and successive pregnancies tend to loosen the attachments which held the kidney in its place and thus favour displacements. That it is common on the right side may be due to tight lacing. The pressure exercised on the liver by the stays thus dislodges the right kidney. In the left side the pressure of the stays can be well borne by the spleen and the stomach and therefore there are less chances of displacements. Causes.

*Varieties of displacements.*—Of position: they may be floating or moveable and fixed. *Fixed*: the displacement may be in any direction, and may be acquired by pressure of any enlarged growth in its vicinity, or may be congenital. In such cases, the kidneys are often found in front of the vertebræ or in the iliac fossa. The congenital anomaly is often associated with changes in its configuration, and also with malposition of some of the other abdominal organs. The fixed displacement is much more common in the left than the right side. Cases are recorded of congenital misplacement in which the kidney lay on the sacro-iliac synchondrosis, in some cases between the bladder and the rectum, or across the sacral eminence. Such cases when they occur in females, greatly interfere with parturition. Varieties of displacement.  
Of position  
Fixed.

*Symptoms.*—Misplaced fixed kidney feels like a moderate sized tumour in the abdomen, having an elastic feel, lying obliquely, or laterally, or directly upwards and outwards or forwards and inwards, between the umbilicus and the thorax. In the corresponding lumbar region there will be absence of the kidney. If grasped, a feeling of sickness is generally produced. Symptoms.

*Moveable kidney.*—The kidney lies loose in the ab- Moveable kidney.

domen, when the patient stands it may descend below the margin of the ribs, or may lie obliquely between the umbilicus and the costal border. The tumour has the form and feel of a kidney, and can be pushed in any direction, over a space of one or two inches. In persons with attenuated belly, it can be easily grasped, and on compressing it a sickening sensation may be felt. When the patient lies in bed he can, like an hernial protrusion, thrust it back with his fingers into its normal position in the lumbar region, but on again rising it will be soon displaced. The displacement varies with change of posture. There is absence of dull sound in its natural position in the lumbar region, and its place being taken by intestines a tympanitic sound is heard there. The renal region is flattened and slightly hollow to palpation.

**Symptoms.**

*Symptoms.*—In some cases, they are very slight or altogether absent. In others, the misplacement causes great inconvenience. The patient complains of dragging pain, increased on movement; often attended with great uneasiness and disorder of the stomach and bowels. Very often the organ becomes engorged and there are severe colicky pains with fever and swelling of the tumour in the abdomen. There is a moveable tumour of the size and shape of the kidney, in the hypochondriac region, which can be readily pushed back into the loins. If while the tumour is in the abdomen, the lumbar region be examined there will be flattening or hollowing of the part which will also be tympanitic on percussion.

**Treatment.**

*Treatment.*—The painful sensations, if any be present, must be treated. If practicable, replace the organ in its normal place, or if adhesions have not occurred, support it steadily by a belt or a tight bandage. If due to anæmia give iron, shower baths, and regulate the bowels. Tight-lacing and fatiguing exercise should be avoided. If symptoms of engorgement be threatening, perfect rest,

leeches or poultices to the loins may be of service, and opium should be enjoined to relieve pain.

*Horse-shoe kidney.*—Is a variety of form of displacement ; Horse-shoe kidney. the deviations may be congenital or acquired by pressure of tumours ; sometimes one kidney may be hypertrophied owing to deficient development of one renal artery ; sometimes there may be one kidney with two pelves united to a single ureter, or there may be one kidney with two ureters distinct. It may consist in the fusion of two kidneys into one, each half possessing a separate pelvis, and ureter. In such cases the concavity is directed upwards, and ureter descends in front of the transverse portion.

*Absence of one kidney or additional kidneys.*—Is a third Absence of one kidney or additional kidneys. variety. In cases of absence of one kidney, the existing organ is considerably hypertrophied.

#### CERTAIN URINARY SYMPTOMS.

*Diuresis.* — Diuresis literally means to pass urine D'uresis. through ; it also signifies daily excretion of excessive quantity of limpid water. It means constant running of water through the patient's system. It is due to unknown causes, and attacks males between four and thirty years ; it is also known as diabetes insipidus. The urine is not saccharine.

*Symptoms.*—Dry skin, insatiable thirst, and excretion of Symptoms. an excessive quantity of urine. The watery constituent is alone increased, though the solids are the same as in health. The patient loses flesh and strength, and complains of debility of the mind. The quantity of water passed in twenty-four hours is sometimes so great, that it is often in excess of that consumed. Some water is also removed by the skin and lungs. The body becomes poor in water, and so loses its weight.

*Treatment.*—Astringents are recommended. Nervous Treatment. exhaustion may be remedied by nervine tonics ; health may be improved by animal diet.



Infantile  
diuresis.

*Infantile diuresis.*—Is an affection extremely common in children after weaning, met with in every day's practice in Bombay. The child continues healthy up till weaning, when it begins to lose flesh without any apparent cause, and becomes dull and stupid. When the child urinates the urine is scanty, high coloured, turbid on cooling, and a chalky deposit of phosphates, often mixed with urates and oxalates, collects on the ground. The skin is hot and dry, the motions irregular and greenish looking. As the case progresses the abdomen becomes prominent, the child craves for water, and passes large quantities of pale urine containing excess of urea, and even a trace of albumen or sugar. Children so affected are generally strumous and cachectic.

Treatment.

*Treatment.*—The diet must be attended to. The child should be removed to a bracing atmosphere, and have sea-water baths, the functions of the skin should also be increased, and general irritability, if any, removed. Bowels must be regulated.

Chyloserous  
urine.

*Chyloserous urine. Chyluria.*—Is a disease of the tropics and very common in India. It is said to be endemic in Brazil, Mauritius, and West Indies. In this affection the urine is whitish opaque like milk, occasionally of rose tint from admixture of blood, is often mixed with blood clots. It contains fibrin and albumen. When allowed to stand for a long time fat collects on its surface, and a soft coagulum forms in the urine. The coagulum is shaky, and can be compared to blanc mange. After a time the coagulum breaks and flaky clots are formed. Where coagulation takes place in the bladder it causes pain and difficulty in passing urine. Under the microscope the urine contains fat molecules like the fat of chyle, a small portion of red corpuscles, renal epithelial cells, leucocytes, nuclei, and oil globules. Casts or other evidences of structural disease of the kidney are absent. Very often the urine is lymphous and

not chylous, that is, it contains albumen, and the coagulum resembles calf's foot jelly. In some cases the urine passed early in the morning only contains fat. More commonly fat is found in the urine passed after meals. In some cases it appears only periodically, in others it altogether disappears on change of climate, and does return with the return of the patient to his original place.

*Causes.*—The disease is more frequent in adults than in children, and in females than in males. May follow a fall or shock, or a hard mental work, or occur without any known cause. Causes.

*Pathology.*—It may be due to defective assimilation, in which case fat, albumen, and fibrin of chyle pass through the kidneys instead of being converted into blood. This is owing to hypertrophy of the urinary passages, in which case the urinary absorbents give way and their contents pass into the urine. This view does not always hold good, for there are rapid alternations of clear and chylous urine within short intervals. If fibrin fat, albumen, &c., found in the urine be due to hypertrophy of the urinary passages they should be accompanied with tubular casts, but such is not the case. The true explanation may be based upon cases where, like vicarious menstruation taking place from the lymphatics of the skin, chyle in the urine is found discharged from the lymphatics of the bladder. In cutaneous cases the lymphatics swell, and a bleb is formed from which, on being opened, a large quantity of blood escapes. In chyluria there is often found swelling of the lymphatics in the scrotum and lower parts of the abdomen. Pathology.

*Symptoms.*—The invasion may be gradual or sudden. The symptoms intermit, but not always. Attacks may last for a few days or weeks or years. The interval varies, but is never regular. Suspensions and renewals are very abrupt. During the invasion the patient is emaciated owing to unnatural drain of the nutritive material. He is extremely Symptoms

anxious about himself, and suffers from general depression of the body and mind. He loses flesh and strength, has complete inaptitude for work, now and then suffers from severe backache, indigestion, and passes or fears to pass restless nights.

A case is recorded where on post-mortem, the cortical and pyramidal portions of the kidneys were studded with parasites (*Filaria sanguinis hominis*), also with oil-like tubercles running along the uriniferous tubes as if the lymphatics were plugged. The kidneys were healthy. It may be supposed that these worms give rise to ruptures of the lymphatics and thus their contents escape into the urinary channels.

**Treatment.** *Treatment.*—Liniments of soap and camphor with opium are the only agents from which some relief may be expected for backache. A tight belt round the loins may be serviceable. Vegetable diet may be tried.

**Hæmaturia.** *Hæmaturia* or blood in the urine. It denotes blood from any part of the mucous membrane of the urinary tract.

**Causes.** *Causes.*—1. Wounds, contusions or injuries from calculi, irritation of drugs as turpentine, cantharides, and violent exercise. 2. From intense hyperæmia as a cancerous growth, obstructive engorgement. 3. Hæmorrhagic diathesis, other morbid conditions of blood as purpura, scurvy, acute fevers, and cholera. 4. May be endemic, as in Brazil, or may be due to infarctions or to true apoplexy. 5. Vicarious menstruation and hæmorrhoids. Is common in anasarca from scarlatina.

**Anatomical appearances.** *Anatomical appearances.*—Infarction is cuneiform, and points towards the hilus. This may become pale yellow, caseous or pustuloid. Hæmorrhagic clot is generally in the medullary portion. In such cases parenchyma is lacerated, and a clot mixed with broken-up tubules is found.

**Symptoms.** *Symptoms.*—Is recognised by blood in the urine. There

is a flocculent precipitate on standing. On the application of heat albumen is coagulated. Blood is known by Haller's test, which consists in the application of heat to the urine, then adding liquor potassæ, and heating it again, when the phosphates will be precipitated yellow red from the colouring matter of blood. Microscope is the surest means of discovering blood in the urine. The corpuscles present nearly their biconcave contour, and are smaller. They are also crumpled and misshapen. Their outline is well marked, there is absence of cell contents and of nuclei. Moulded blood casts are found, and other renal structures. The casts appear in the form of round worms. Blood may be discharged before or after urine or altogether, independently of any urine. It may be in drops or profuse in quantity, may be intimately mixed with urine or separate in coagula or clots. When originated from the *kidneys* it is diffused throughout, and the urine is smoky. After a time a grumous coloured deposit subsides, and there is a flocculent precipitate on standing. If from the bladder or urethra it may be due to stone or villous growths, and symptoms point to frequent micturition, to pain in the hypogastrium, and blood is passed either at the commencement or after the urine. The passage of a catheter reveals stone or villous growth. If from *the bladder* the blood is passed alone, but generally precedes the urine. In some cases it only colours the first portion of the urine passed, the rest being clear and free. In the case of *urethra* the blood is passed during the interval. In both cases without any renal casts. Scorbutic hæmaturia is not much. In infarctions hæmaturia is slight. It generally begins by a chill and sympathetic vomiting. Hæmaturia is rarely serious from its quantity in any form of Bright's disease. That from the substance of the kidney is serious as it often causes coagulation of the effused blood into the urinary passages, and unless expelled

Blood in urine.  
Haller's test.

Microscope.

Worm-like casts.

From kidneys

From bladder or urethra.

Bladder.

Urethra.

Infarction.



- by the force of urine from behind the coagula, blocks up the ureters and ultimately leads to obstruction of the gland. *Cancer* is often associated with profuse bleeding and hæmorrhage is persistent. Hæmaturia is endemic with the people of Mauritius, Brazil, Egypt, and other hot places ; in them it is very profuse and is due to the presence of a parasite known as *Bilharzia hæmatobia*. These infest the mucous membrane of the bladder and pelvis of the kidney.
- Congestion of kidneys.* In *active congestion* of the kidneys after irritants or turpentine or cantharides hæmorrhage is scanty. Hæmorrhage also occurs from the presence of *calculi* in the kidney and is apt to occur again and again. The blood may be passed constantly or after exertion. In such cases the microscope is a great aid in detecting uric acid or oxalates in the urinary deposit, there are also transparent fibrinous casts, and a very large quantity of albumen. Hæmorrhage from the pelvis of the kidney or ureter may be due to calculi, and in it there are symptoms of pyelitis and of renal colic, and sometimes blood coagulates in the ureter.
- Treatment.*—Hæmorrhage if slight, and due to congestion which occurs in acute Bright's disease or after a dose of turpentine or cantharides is salutary. If profuse it may be relieved by derivation to the loins as by cupping, to the skin by hip baths and diaphoretics, and to the intestines as by cathartics. When bleeding is supplementary to hæmorrhoids, leeches about the anus do good. Rest and application of cold to the part are useful. In bleeding from the bladder injection of perchloride of iron, of gallic acid, or of acetate of lead, is useful. If the kidneys are at fault, apply poultices to the loins. Do not use turpentine, as it produces strangury.
- Hæmatunuria.* *Paroxysmal hæmaturia.*—Is characterised by paroxysmal attacks of severe rigors followed by blood-like urine ; during the interval the patient enjoys perfect health. In this affection there is escape of the colouring

matter of blood with the urine without any rupture of renal capillaries. The urine is of a blackish-red colour, does not contain blood disks nor any fibrin. Albumen is present. It is said to be caused by a rapid destruction of blood disks, as occurs in purpura, putrid fevers, &c., that such disks are set free and found in the urine.

*Causes.*—In adult males it is very common. Is often traced to exposure to cold. Causes.

*Pathology.*—Like ague or rheumatism, it has been regarded as an affection of the blood. It has some relation with the kidneys is true from the fact that the fit depends on a cutaneous chill, attended with congestion of the kidneys, and that the chill and also the congestion subside with the discharge of blood-like urine. It may probably be due to the transmission of an influence from the skin to the vaso-motor nerves of the kidneys, and thus its small vessels become dilated. Pathology.

*Symptoms.*—The onset is sudden, there is chilliness, or a feeling of uneasiness across the loins, or it sets in with cold skin, rigors, aching of the limbs, nausea, vomiting, and retraction of the testicles. The temperature is about 95° or 96°. This condition lasts two or three hours, and the patient passes blood-like urine, and there is slight feverishness for a time. The urine is faintly acid, of high specific gravity, and contains albumen, granular and hyaline casts, crystals of oxalate of lime, a brownish granular matter, and scattered blood corpuscles. After a time patient feels quite well. The disease is subject to recurrences and each subsequent attack follows the same range of symptoms as the preceding one, and it is also traceable to cold. In many cases the recurrences resemble that of ague, and like ague their attacks may be once every day, or once every other day, or at a fixed hour. Such variations often last for months. During the attacks the health is seldom deteriorated, and the kidneys do not suffer from any lesion. Symptoms.

**Treatment.** *Treatment.*—Antiperiodics have been tried, but are of no avail. Iron to relieve anæmia, and ergot, digitalis, gallic acid, &c., to contract the arteries of the kidney, have met with the same bad result. Best treatment is the prophylactic. Give rest in bed, keep the patient warm; he should be warmly clad, and avoid exposure to cold draughts.

**Calculi.** *Renal calculi and renal colic.*—Calculi are concretions due to abnormal deposit of some of the constituents of

**Uric acid.** urine upon a nucleus. Uric acid calculus is common in gouty diathesis. In them the urine is scanty, acid, and of a high colour. The calculus, if formed, is hard, tubercular, heavy, oval and depressed, and of moderate size, and covered with urinary pigments, may be one or several.

**Urates.** Calculi containing urates, always form in the kidneys, and are commonly found in new-born children. In them the urine is acid, the concretions soft and irregular.

**Mulberry calculi.** *Mulberry calculi or oxalate of lime calculi.*—Are very hard, of moderate size, rough and grating like mulberry. *Phosphatics* are rare except in ammoniacal urine, and as a consequence of decomposition. Minute concretions are often discharged, and are known as gravel.

**Pathology.** *Pathology.*—Renal calculi are often primary, and due to some deposit from the urine. The deposit may be an excess of normal ingredients as cystine. Any abnormal condition of the urine, as highly acid or highly alkaline urine diminishes its solvent power and thus leads to the deposit of its ingredients. If a calculus be examined we find a central nucleus surrounded by a body, and outside all a crust. The nucleus may or may not be of the calculus; sometimes it may be a foreign matter.

**Symptoms.** *Symptoms.*—Calculi may quite fill the pelvis. Red, gritty deposit in the urine indicates uric acid infarction. Sometimes calculi give rise to no symptoms. Sometimes there are sudden, dull, aching, colicky pains on jolting in the lumbar region, shooting in various directions; patient screams and

is cold, and there is a cutting pain at the end of the penis during micturition. Its direct irritation causes hæmorrhage. The urine contains blood, pus, epithelium, uric acid, or oxalates. There is great restlessness, constant desire to pass water, but urine is scanty or suppressed, or discharged in drops. There is nausea and sickness. In unfavorable cases there is great collapse, faintness, skin becomes cold and clammy, pulse exceedingly feeble. The paroxysm hardly lasts over twenty-four hours. Rarely death occurs from convulsions. In favorable cases the calculus reaches the bladder, the symptoms suddenly subside, patient feels intense relief, and recovery follows.

*Characteristic symptoms of calculus.*—1. Aching pain in the region of the kidney, more severe than that of a calculus in the bladder. 2. Occasional blood in the urine, and blood often induced by jolting or jumping. 3. The pain relieved by change of posture. 4. The pain is intense if the calculus enters the ureter, and continues intense so long as the calculus is passing along it. The pain is radiating through the abdomen, down the thighs to the testes, which is also retracted. The pain is attended with nausea and vomiting, or with rigors and faintness. There is also tenderness. Flexion of the thigh also increases the pain.

Characteris-  
tic symptoms.  
Pain.

Blood.

*Treatment.*—Examine the urine, and if acid or alkaline remedy it accordingly. Relieve the general symptoms and pain, especially by opiates. Find out the cause and remove it, and attend to the diathesis. Facilitate the passage of a calculus from the kidney into the bladder. Support the strength by a plain but nourishing diet, spirits being strictly avoided. Even whisky does harm, as it causes dryness of the tongue and skin, and also lessens the quantity of urine. Colic may be relieved by leeches, warm baths, use of free diluents, full doses of opium and belladonna every hour or two, or subcutaneous morphia injection, or inhalation of chloroform. Bowels should

Treatment.



be freely acted upon. During the interval attend to the diathesis. In cases of uric acid calculus, vegetable diet, diluents, gentle exercise, total avoidance of spirits, and free use of alkalies are beneficial. In other diathesis the diet should be generous and mineral acids enjoined.

Diseases of  
the skin.

## DISEASES OF THE SKIN.

The skin is an extremely complicated organism, consisting of epidermis with the hair and nails, the papillary and reticular layers of the cutis, the subcutaneous connective tissue, and the sebaceous and sudoriferous glands. Any one of these constituents is liable to morbid processes, such as inflammation, growths, hypertrophy, atrophy; or to mechanical derangements, as congestion, œdema, &c. It is a common factor in specific febrile diseases. It has three important functions to perform—1. Sensation; 2. Secretion; and 3. Excretion. It also protects internal organs from the effects of various morbid processes to which they are liable.

Classification

*Classification.*—Numerous classifications of skin diseases have been proposed, but none of them rest upon a sound pathological basis, and they often serve rather to obscure the subject than to promote the true end of classification and expression of exact relations and differences. I have therefore thought that for general purposes an alphabetical arrangement is as convenient as any.

In treating the diseases of the skin we should always trace out the origin and course of the disease and determine its various stages. Very often the disease comes under observation long after its earlier stages have passed, and when the malady has become chronic and indolent, and has then lost its characteristic features. In them the history is a great guide. Where two or more kinds of eruptions are associated together in varying proportions,

the difficulty in diagnosis becomes great. Diathesis and various other constitutional peculiarities are common originators of skin diseases. They generally take on an inflammatory action, and therefore in such cases those causes which tend to increase inflammation, as exposure to heat or cold, any undue irritation, mechanical or otherwise, and even mere rough handling or scratching of the skin should be avoided. Skin diseases are common in the young, and are often the result of imperfect digestion or of deranged assimilation. When they occur in old people they are due to senile degeneration. In the adult and advanced age habits and occupation of the individual have a great influence in producing skin diseases.

*Pathology.*—An eruption, soon after its appearance, undergoes active congestion, and, as a result, it converts itself into papules, vesicles, bullæ, pustules, and scales. These are known as chief or primary changes or *elementary lesions*. Tubercles are not due to the same cause, but are the results of hypertrophic changes or of morbid growths. The elementary lesions often undergo *secondary changes*, which are either the necessary results of inflammation, or may occur by some indirect or accidental causes. These changes are ulceration, desquamation, excoriations, scars, crusts, pigmentation, maculæ, or stains.

*Primary elementary lesions.*—*Hyperæmia of the skin.*—Redness or hyperæmia may be active or arterial, and passive or venous. Active hyperæmia consists of redness of the papillary layer of the skin. It may be either diffuse or circumscribed. The capillaries, being highly injected, look like minute bright dots. It is a term applied to a patch of eruptions or to a single spot generally appearing during specific fever. The eruptions are very slightly elevated; in case of rash, as in scarlet fever and measles, they fade on pressure, and there is slight rise of tempera-

*Pathology.*

*Primary elementary lesions.*

ture. In nettle-rash, roseola, erythema, and erysipelas, the eruptions are also associated with a rash. In passive hyperæmia the skin has a uniform red appearance, and to this form the term erythema has been applied. The redness is circumscribed or punctiform, as in strophulus; or in patches, as in roseola; or is accompanied with swelling due to inflammatory effusion, as in erythema papulatum. In hyperæmia there is also disordered sensations as characterised by heat and scratching, as in pruritus, urticaria, or scarlatina. Hyperæmia is often followed by desquamation, and occasionally also by exudation. Desquamation is often the result of exudation into and between the layers of the cuticle and thus causing their separation and shedding. It is also the result of a high temperature, which interfering with the nutrition of the cuticle causes its death and separation. In hyperæmia there is at first congestion of the papillæ, this is soon followed by exudation of serum into their substance and around the hair follicles. At each follicle a raised round elevation called a papule or pimple is formed, as is best seen in measles. When the exudation is of a plastic kind it forms a hard, solid, persistent papule, and each papule consists of erected hyperæmic follicle, as in prurigo, strophulus, and lichen tropicus or prickly heat. As a rule, papules are always attended with itching. They may be due to deposit of lymph about the walls of follicles, as in lichen planus, or are solid lymph formations in the derma proper, as in syphilis, prurigo, or due to epithelial collection in the follicles, as in pityriasis, or are formed by hypertrophy of normal structure, as in papillary warts. *Vesicle* is another result of active congestion or of inflammatory serous exudation. In it the eruption finds its way between the horny layers of the epidermis and the rete mucosum. The cutis becomes raised by the exudation fluid in the form of minute blisters, each bleb containing clear fluid. The bleb may

Pimple.

Vesicle.

be single, often of the size of a mustard seed, or in groups. In groups they generally coalesce and form large *bullæ*. They project above the skin, and are of a peculiar greyish or bluish colour; *e. g.* aphthæ, cow-pox, chicken-pox, eczema, herpes, miliaria. Where the vesicles are solitary and the contents sweat-fluid, the affection is called *sudamina*; if larger, *pemphigus*. These differ from vesicles in that the vesicles are of an inflammatory origin, their contents alkaline and often turbid or tinged with blood or pus, that of the sudamina being clear and acid. The *bullæ* is another term for large vesicles, the contents of which often become sanious. They often end in ulceration. Very often vesicles contain pus cells, and are thus converted into *pustules*. In such cases the skin is denuded of its outer cuticular layer, and the pustules burst and form a yellowish scab or crust. The *pustules* are characterised by more inflammation than in vesicles, by deeper affection of the tissues, and by the loculi formed by the cells in the rete mucosum containing pus, *e. g.* ecthyma, impetigo, prurigo, scabies, and variola. In some cases the pustules are large and deep seated, and have painful hard bases. *Squamæ* or *scales* are detached plates of the epidermis. They vary in size; may be thin or thick and laminated; may be soft or hard, and may present various colours. Commonly seen in ichthyosis, lepra, psoriasis, and pityriasis. They differ from *crusts*. The *crusts* are the result of only dried discharge. They consist of detached epidermis and sebaceous matter, and are chiefly the result of inflammatory exudations, which dry up and form scabs. The exudation may be serum, pus, or blood, alone or combined. When the serum alone forms a crust it is yellowish or brown and translucent; in case of pus the scab is greenish and thick, and if blood be exuded it is dark coloured or black. Thus, crusts result from the hardening of an exudation, as in eczema, or of sebaceous matter, as in ichthyosis. In many

Pustules.



cases, as in lepra, the crusts are an overgrowth of the epidermis, and they therefore form scales or raised masses over an inflamed base.

Furfura.

*Furfura*, *scurf*, or *dandrif* is a desquamation from the surface of the skin, and chiefly of the scalp. Where plates of detached epidermis come out the affection is called *squamæ*. Scurf consists of a mixture of epidermis and sebaceous matter.

Tubercles.

*Tubercles* are nodular and fleshy elevations of the skin. The growths are generally chronic or permanent, and formed of new tissue. May be homologous as in keloid and fibroma; or heterologous, as in cancer, syphilis, simple warts or lupoid growths, or may be thickening and exudation of sebaceous glands. They may be scattered or in groups, *e. g.* acne, anthrax, elephantiasis, molluscum, syphilis. *Wheals* are temporary elevations of the cutis. They are the result of sudden dilatation of the capillary vessels. May be flat or circular, and are two or three lines in diameter. Have a polished centre; they rapidly appear and disappear under a stroke; are accompanied by heat, great tingling, and always with itching, *e. g.* urticaria. They resemble serous papules, but in papules there is exudation in the substance and round the hair follicles. In wheals the exudation is round the vascular layer of the skin. The pressure of the exudation upon the capillaries squeezes out the blood, and thus produces a pale centre with bright red circumference. The swelling suddenly disappears because of the exudation being rapidly reabsorbed by the vessels.

Secondary  
elementary  
lesions.

*Secondary elementary lesions.*—*Crusts.*—These are formed by the drying up of the discharge poured free upon the surface of the skin through an inflamed derma, as in eczema, or from ruptured vesicles, as in rupia, or from an ulcerating surface. May be due to a collection of fungus elements, or of sebum in masses, as in *favus*. They are generally the result of the escape of serum, thin and bright coloured, or

of dried pus, thick and yellow, or of drying up of bullæ, thin and dark coloured, or of sanious pus from ulcers, thick, dark, and heaped up, or of firm dried sebum, flat and greasy. In favus the crust is pulverulent or honey-combed, or sulphur yellow.

*Ulceration*.—It is the result of inflammation in cachectic, strumous, or syphilitic subjects, or of morbid growths replacing the normal tissues and undergoing softening and decay. Cancer is the best example. Ulceration.

*Excoriation* is a mere exposure of the true skin without any removal, and is due to the irritation of scratching or rubbing. When in the bends of forearms and thighs these excoriations suggest scabies, and when about the shoulders phthiriasis. Excoriation.

*Scar* is the result of injury, or of application of caustics, also occurs in exanthematous diseases which have a tendency to ulcerate, as smallpox, in strumous and syphilitic diseases, in anthrax, and herpes zoster. The production of a scar depends upon the depth and character of inflammation. Its presence indicates destruction of the true skin, which is replaced by cicatricial tissue. The fibrous tissue on contracting leaves a pit or depressed white mark. Scar.

*Maculæ or stains* are pigmentary deposits on the skin, and are due to the colouring matter of the blood. The discoloration does not fade on pressure. May be secondary to syphilis, pregnancy, Addison's disease, or leprosy. They are often due to long use of nitrate of silver or of iodine, to excess of bile, or of acids in the stomach, or to existence of parasites or fungus elements; may be due to hæmorrhagic diathesis, as in purpura, to exanthemata or rash. The stains are superficial red patches, variously figured and diffused over the body, leaving interstices of healthy-coloured skin, and terminating generally in exfoliations; *e.g.* freckles and moles. Maculæ.

Besides the whole skin each of its separate structures is also liable to disease. Thus, *warts* are enlargements of

the papillæ only, each containing a loop of vessels and nerves. *Corns* are similar in structure to warts, only that in the latter the epidermis is much thickened. *Acne*, again, is an inflamed swelling of the skin, the sebaceous secretion of which is retained in the follicles. Its surface becomes covered with dirt, and forms a black spot over the skin, which when squeezed its secretion escapes like a little grub. Very often *vegetable parasites* affect the skin, and are confined to the hair. They are rarely found on the surface of the skin; *e. g.* pityriasis versicolor, tinea tonsurans, tinea circinata, sycosis, and pediculi, or lice. Many diseases of the skin have an *hereditary tendency*; *e. g.* infantile syphilis, ichthyosis, psoriasis, eczema, and lichen. Very often blood poisoning, due to contagion, gives rise to skin eruptions, as in eruptive fevers. *Derangement of functions*, or organic or inorganic diseases of internal organs often produces skin diseases. Age and sex have also an important influence in the production of skin diseases. Thus, lupus is common in women; porrigo is peculiar to children; acne to the young; tinea tonsurans is also common among children; and pityriasis versicolor among adults; sycosis is a disease common to men. Various *general diseases*, as rheumatism, gout, &c., favour psoriasis or eczema. Alcohol is said to generate acne rosacea; shellfish and fruits, and even, in many cases, arsenic, mercury and copaiba, cause urticaria; Various local causes, as want of cleanliness, give rise to eruptions on the scalp. Application of irritants to the skin either as a drug or of mere flannel as underclothing, excites various forms of eczema; mere scratching of the affected skin often propagates the disease to other parts, or modifies skin diseases if any present; scabies is thus transferred from one part to another, and porrigo is aggravated by constant scratching.

Diagnosis.

*Diagnosis.*—In diagnosing a disease of the skin, attend to the symptoms which are apparent on the surface of the

body. In such cases the sight, touch, and smell are the best guides. The history of the patient and the patient's own symptoms should be noted. We must minutely inspect the whole of the eruptions, and also the whole of the body. Certain skin diseases, as eczema, lichen, scabies, and prurigo, are always attended with scratching, not so with syphilitic eruptions. The scratching has a tendency to alter the appearance of eruptions, and the eruptions are therefore, in many cases, of a mixed variety. Thus eczema is often found mixed with scabies or psoriasis. In many cases the eruptions are abortive. Thus, in modified small-pox, the vesicles, instead of forming pustules, may also wither and dry up. We have also to determine whether with the eruption the constitution is involved or not, the patient prostrated or is healthy, the temperature high or normal, the fever intense or slight, or none at all; whether the disease came on suddenly or gradually; whether it is attended with local inflammation or with its results, as sero-purulent discharge, bullæ, pustules, or scales.

*Treatment.*—There is nothing absolutely special. The Treatment. same general principles of therapeutics are applicable in these as in other diseases. Prevent the affected parts from being constantly irritated and becoming soon dry and cracked, as they always do by being exposed to air. They should be kept protected and supple by means of applications of oils. *Locally.*—Promote absorption of exudations if any exist, or bring about resolution. The growths may be removed by surgical means, or by caustics. In erythema, eczema, seborrhœa, squamæ; astringents, as alum, acetate of lead, borax, bismuth, myrrh, tannic acid and oxide of zinc are very useful. *Absorbents* are remedies for excoriations generally. Powdered oris, fullers earth, oxide of zinc, powdered starch, are the remedies successfully tried and recommended. *Baths* are useful adjuncts. In erythema, scabies, and in scaly diseases, hot water infused with



bran and gelatine are useful. In eczema, psoriasis, urticaria, and other skin diseases attended with considerable amount of local irritation, baths of alkalies as bicarbonate of soda or of borax with hot water are recommended. In chronic skin diseases, hydrochloric or nitric acid is added to the bath with benefit. Some recommend sulphur baths as a better remedy than the alkaline or the acid baths. In syphilitic eruptions a mercurial bath is highly advantageous. In all these cases the patient must be allowed to remain in the bath for at least twenty minutes. The heat or vapour should be applied to the drug, and a steam of water should at the same time surround the patient. The patient should also be covered with a sheet and seated on a chair. *Caustics* are useful local applications. In lupus, condylomata, and various unhealthy ulcers, bisulphide of mercury, arsenious acid, caustic potash, chromic acid, powdered savin, and carbolic acid are useful. *Plasters* are useful applications in syphilitic papules, acne rosacea, tubercles, indurations, and in syphilitic cracks, fissures and excoriations. Those containing mercury are used with benefit. For boils a plaster made of camphor, pitch, red oxide of lead and salad oil and known as the emplastrum tuscum, is used with success. *Sedatives*.—Remedies are used in cases where itching is unbearable, as in eczema, urticaria, pruritus vulvæ and various pruriginous eruptions. Thus morphia, chloroform, belladonna, digitalis, camphor, are highly recommended. *Stimulants* are locally applied in eczema, psoriasis, syphilitic ulcerations. Various preparations of alcohol, oil of lavender, iodoform, iodine, mercury and sulphur are also used in skin diseases. Tar is used in psoriasis chiefly, also in vesicular and papular diseases. Nitrate of silver in eczema and erythema. *Vegetable parasites*, as favus, tineæ, pruritus vulvæ, and all forms of ringworms, baldness, &c., are locally treated by various preparations of mercury, by liniments of ammonia, by lotions of can-

Sulphur  
baths.

Caustics.

Plasters.

Sedatives.

tharides, and of carbolic acid, and by blistering fluids and even by iodine.

*Diet.* — Where the patient is poor and ill-fed and the disease is due to deficiency in the quantity and quality of food, and to want of proper sanitations, tonics, good food, cleanliness, and attention to various sanitary laws, speedily cure the disease. In the plethoric and in those who live luxuriantly the disease can be checked by attention to their diet. Very often eczema, psoriasis, arise from defective secretions and are common accompaniments of dyspepsia, gout, rheumatism, &c. In them avoid seasoned dishes, stimulant drinks, hot and spicy food, also coffee, tea, and pastry. In acne, psoriasis, and eczema, in erythema, and papular affections preparations of mercury and iodide of potassium, with iron in one form or another, or even minute doses of arsenic are recommended. Some use iodide of sodium, in obstinate syphilitic eruptions, where iodide of potassium fails or disagrees. In eczema of the legs with œdema or hyperæmia of the skin various diuretics and aperients are needed, and digitalis may be added if required. In cases of parasites, paracitocides may be used. Where the disease is inflammatory and runs a certain course of definite duration as in roseola, carefully avoid complications. Scratching should always be avoided and air excluded from the inflamed surface by suitable means. After congestion has been subdued astringents or stimulating applications are useful in promoting absorption of inflammatory thickenings. In all cases of skin eruptions constipation with torpid liver and dyspepsia are very common accompaniments, and must therefore be first removed. Where secretions are suppressed or retained the skin tries to take on a compensatory action, and so becomes diseased. Often the retention leads to diseased state of the blood and thus aggravates skin diseases. Thus in torpor of the kidneys eczema of the legs is common. In

Diet.

Iodide of potassium.

struma the eruptions always take on a purulent character. Above all the health of the patient and the condition of the internal organs, and in females menstrual derangements, must always be attended to.

Acne.

*Acne*.—Is an inflammation of the sebaceous glands and their ducts, and of the upper part of the hair follicles. It results from the retention of sebum, and attacks the face, shoulders, nose, cheeks, forehead, buttocks and breast. It is a disease of puberty when the hair follicles are in a state of great activity. The sebaceous glands contain unnatural secretion. The glands may be open or their orifices obliterated. When open the orifices are dilated and prominent, and on pressing they emit maggot-like bodies or comedones. Where the orifices are closed the contained sebum forms a hard pearly mass of a yellow colour, as seen about the face of children, and is then called *strophulus albidus*. The inflammation often runs on to suppuration, and matter containing pus and sebum is discharged. When the sebum collects into the hair follicles it forms a series of papules like black points, and is then called *acne punctata*. When in the hairy region of the face the acne is hard, indurated, and black, and resembles *sycosis*.

*Strophulus albidus*.

*Sycosis*.

Varieties.

*Varieties*.—1. *Acne punctata*.—In this variety there is retention of sebum without any inflammation or formation of pimples. 2. *Acne simplex*.—There is retention of sebum, inflammation, and even suppuration of the hair follicles. 3. *Acne indurata*.—There is considerable induration at the base of the follicles with a certain degree of suppuration. 4. *Acne rosacea*.—It is a chronic inflammation of the sebaceous glands especially of the nose, and is accompanied by inflammation and hypertrophy of the surrounding tissue. The affected part is highly vascular, and its blood-vessels are in a varicose condition. It is only limited to the head. It forms large patches of redness, associated with effusion into the cutis and dilatation of the

capillaries. There is presence of scattered tubercles resembling acne indurata upon the inflamed patches. In a majority of cases, inflammatory products and tubercles remain permanent. The disease lasts for years. When acne exists on the nose or on the face it causes great disfigurement. In persons addicted to hard drinks, patches become more developed, the nose swells, and becomes a lobulated pendulous mass. The affection is common in women with disordered menstruation, and also in the dyspeptics. It is aggravated by errors in diet, and by local irritants. The existence of syphilis and struma tends to its rapid suppuration and ulceration, and thus modifies the disease. 5. *Acne vulgares*.—Is an hereditary disease, occurs between eighteen and twenty-four years of age. Its most common seat is the hair follicles and sebaceous glands. The eruptions contain concrete sebaceous matter or exist as little white swellings with a black spot. The gland at first becomes inflamed and a pimple is formed like a minute boil; the eruptions leave small scars. All parts of the body except the palms of the hands and soles of the feet may become affected.

*Treatment*.—Avoid liquor, remove the plug of sebum, and lessen hyperæmia. Give tone to the vessels and to the general system, and promote absorption of exudation products. In acne punctata warm baths, alkaline washes, and friction with soap and water are useful. Tonics, cod-liver oil, &c., should be given if struma exist. For syphilis give iodide of potassium. Touch the indurated spots with acid nitrate of mercury. Dyspepsia, debility, tippling habits, and even disordered uterine functions should be attended to and removed. If the vessels are varicose cut them across, and then apply collodion. After the irritation has subsided, sulphur in any forms may be locally applied.

*Acarus (a mite)*.—*Acarus autumnales* or bugs.—These

*Treatment.*

*Acarus.*



insects attack any part of the body and cause considerable irritation. In India, in houses and in beds, these insects are met with luxuriantly. They burrow the skin, but do not propagate their species. They produce rosy papules with a central puncture. *Treatment*.—Get rid of the bugs from the rooms or beds, and their irritation may be relieved by baths.

*Alopecia areata.*

*Alopecia areata (tinea decalvans)*.—It means baldness. It is an affection of the hairy scalp, and also involves the eyebrows, eyelashes, beard, pubes, and armpits. Is characterised by a temporary or permanent loss of hair in more or less different areas. The patch of alopecia has a circular or irregular outline, its surface is smooth, shining, and free from scurf and congestion, the skin over it is thinner than in health, and the hair apertures are distinct and atrophied. The patch may present downy hairs here and there, or a few scattered long hairs may stud its surface at long intervals. In the immediate neighbourhood of these patches may be seen short club-shaped hairs. These can be easily pulled out. Often the disease may spread. It lasts for months or years, and may even remain for life. It may be partial or general, may be hereditary or acquired, and idiopathic or symptomatic. When symptomatic it may be due to blood diseases, parasites, or to debility. Idiopathic results from failure in the formation of hairs, from atrophied condition of hair-bulbs, from defective nutrition of cuticle, and from temporary arrest of pigmentation. It looks like a well-defined, perfectly smooth patch of a whiter colour than the surrounding skin and devoid of hair. *Varieties*.—The non-parasitic is called alopecia areata, the parasitic, tinea decalvans. *Treatment*.—Blisters frequently applied to the bald scalp, with stimulating liniments in the interval often do good.

*Tinea decalvans.*

*Carbuncle.*

*Carbuncle*, otherwise called *anthrax*, is a phlegmonous inflammation of the skin with necrosis of the cellular tissue.

The necrosed tissue forms a core, which is discharged with pus through several corresponding apertures. The parts of the skin surrounding the apertures are red, tender, brawny, and indurated. It is always painful, and is attended with irritation, redness of the lymphatic vessels and glands, and with exhausting discharges. Extensive sloughing, ulceration, and pyæmic symptoms are its common accompaniments. The disease is generally seated on the back or back of the neck, or over the ankles; may be single, or two or more may run together. The patient is cachectic and often diabetic. Carbuncle is generally circular in form, varies from an inch to six inches in diameter, and is surrounded with a broad areola of œdematous skin. In favorable cases the excavation is filled with granulations, the inflammatory thickening of the surrounding tissue diminishes, parts return to their normal condition, and swelling slowly disappears. *Boils* Boils. are a modified form of carbuncles, and invade the hair follicles or the attached sebaceous glands or the cellular tissue around. They are more frequent in the back of the neck and in the gluteal region. At first there is pain and slight scratching of the skin; this is soon followed by the formation of a lump of hard skin, which is also red, tense, and painful. The swelling finally enlarges and suppurates. In the cachectic and debilitated it often ends in gangrene. In such cases the cellular tissue is also involved. In India boil is a common accompaniment of roseola among children. In them it is due to milk diet and stale meat. It is of frequent occurrence during convalescence from various diseases. Local irritations, from frictions, also cause it. *Treatment*.—Internally, iron, tonics, cod-liver oil, cinchona, ammonia, and mineral acids, well-cooked green vegetables, wholesome fruit, and moderate stimulants are useful. Locally, apply collodion to the parts. When the carbuncles or boils are sluggish and do not heal readily,

weak carbolic acid lotion answers well. Often applications of belladonna or poultices, or of sticking plasters do good. The diet should be regulated and fresh air enjoined. Liquor Potassæ in ʒss doses if given to adults three times a day proves of great service.

*Condylomata.* *Condylomata* are fleshy outgrowths, more or less hard and sometimes wart like, are generally of a syphilitic origin. Seat: anus, arms, prepuce, and vulva. For further detailed accounts refer to works on surgery. *Treatment.*—If small and hard use nitric acid locally. When large and soft ligature passed through the centre of the mass and tied tightly round the base is serviceable.

*Corn.* *Corn or clavus* is a localised hypertrophy of the skin of the foot. It is caused by irritation from friction, or by intermittent pressure of tight shoes. *Treatment.*—Remove the cause. If the growth is hard pare it with a sharp knife, cut it closely, but do not draw blood. Keep the foot in hot water till the corn becomes soft, and then remove it.

*Dysidrosis.* *Dysidrosis* is an inflammation of the sweat follicles. It consists of an excessive secretion of perspiration, which being retained distends the sweat ducts and glands. Occurs in weakly and nervous persons. Best seated on the hands, and appears as small boiled sago-grain-like bodies. When large they form vesicles which shrivel up. *Dysidrosis* rarely discharges like eczema. Remove the debility, and the patient gets rid of the eruption. Locally, soothing applications, as carron oil, may be tried. Tonics, especially quinine and iron, are useful aids.

*Ecthyma.* *Ecthyma* is a suppurative or pustular affection of the skin. Is deep seated and painful. It is characterised by permanent, isolated, large pustules on the surface of the skin between the true skin and the epidermis, or between the rete mucosum and the layer of epidermis. The pustules are red, swollen, and infiltrated, and surrounded by well-marked congested areolæ. *Ecthyma* often commences as

vesicles (eczema), or as papules (lichen), or as pustules (impetigo). The pustules soon pass on to ulceration, and leave large, adherent, dark crusts behind. *Causes.*—Cachexia, debility, local irritants, as scabies in children and pediculi in adults or scratchings. *Symptoms.*—Pain, sometimes fever. The pustules are rarely numerous; they are matured in four or six days, are isolated and surrounded by a broad, red areola, often seated on the extremities, chest, and throat, rarely on the face. They are hemispherical projections, and are little bigger than a pea. Their contents are liquid yellow pus, often mingled with blood. After a few days the contents dry up and form rounded scabs. The scabs fall off soon, leaving red spots covered with new epidermis, or the scabs stay for a long time, and then fall off, leaving hollow ulcers. *Diagnosis* from *furunculus* in the latter suppuration extends more deeply into the skin, and the affection contains a small central slough. From *impetigo*.—In this the lymphatic glands become inflamed, and occasionally suppurate. In ecthyma the pustule is single and large, and the surrounding areolæ also thick and inflamed. *Treatment.*—Good food, tonics, and mild aperients, and if the ulcers be inflamed soothing lotions are needful. If indolent some absorbents may be necessary. For diathesis give cod-liver oil.

*Eczema* (to boil over) is a catarrhal inflammation of the superficial layer of the skin with serous exudation on its free surface. It is characterised by a moist surface deprived of epidermis and covered with sero-purulent discharge. The discharge always stiffens linen and dries into a yellow thin crust, and hence is regarded as an analogue to the catarrhal inflammation of the mucous membrane. The disease is not contagious. It may be papular, vesicular, or pustular. It is always attended with itching, and runs a very prolonged course. It is liable to recur.

*Causes.*—It may be hereditary, and is common with the



gouty. 1. Direct irritation of the skin as in miliaria rubra or in scabies or from excessive sweating or heat. 2. Obstruction of venous circulation generally. In such cases it is confined to the legs.

Varieties.  
Eczema  
simplex.

*Varieties.*—1. *Eczema simplex* is generally localised, and consists of crowded vesicles on a red base, often the skin does not give way and drops form. When vesicles burst the fluid dries into a thin crust which if removed a moist surface is exposed. Is often excited by local irritants.

Eczema  
rubrum.

2. *Eczema rubrum* is a severe inflammation of the skin. The exudation detaches the epidermis and leaves the red corium beneath, it presents bright red patches of variable sizes, and is chiefly seated on the legs and in the flexures of joints. The affected parts are hot, swollen, tender, itchy, and excoriated, and there is some discharge covered with a crust.

Eczema  
impetigo  
nodes.

3. *Eczema impetigo nodes* or *pustulosum* is characterised by a free formation of pus, a free discharge, and a free yellow crust. It is common with strumous subjects, and chiefly attacks the head. The inflammation is severe, exuded serum is tough, and often pus cells appear intermingled with vesicles and papules, and the scales are thick and darker. It resembles impetigo.

Eczema  
rinosum.

4. *Eczema rinosum* is seated on the palms of the hands and soles of the feet; the cuticle is thick, hard, fissured, and dry.

Eczema  
marginatum.

5. *Eczema marginatum* spreads in patches, has a well-defined raised border, and is met with on the inside of the thighs, armpits, and perineum. Is a very inveterate complaint, as the affected skin is constantly exposed to friction. It is common in men. It is of frequent occurrence in babes and young children, and a frequent attendant on pregnancy and lactation. It is produced by local irritation as of a hard brush over the head. Met with in men who ride much. Vegetable parasites are found in recent cases. It is known as *baker's itch* when excited by the irritation of the flour, and *bricklayer's itch*

when the irritant is lime, and grocer's itch when caused by the irritant action of sugar.

*Diagnosis.*—From lichen, or strophulus, or herpes. Diagnosis.  
Eczema is vesicular. Lichen is papular with pimples on an inflamed surface. Strophulus is a kind of lichen in children. Herpes has a tendency to spread, and has a temporal irregularity of its course.

*Treatment.*—Any local irritation must be removed, and Treatment.  
the part protected by dusting it over with soothing absorbents. Debility or dyscrasia must be properly attended to. Diathesis should be sought for and removed. Loaded stomach or bowels relieved. If the part is thick and indolent, alteratives are highly beneficial. In chronic cases blisters may be applied. Various preparations of arsenic are very useful. Where itching is very great strychnine does much good. In children cod-liver oil with arsenic has immense value. *Locally.*—Remove the crusts by means of oil and poultices. The surface must be thoroughly covered and exposure to air avoided, as air prevents drying up of the exudation and the formation of scabs. Crusts when softened down must be removed and the part well cleaned with soap and boiling water. White precipitate ointment or solution, or vapour baths of corrosive sublimate, may be employed. In very old cases caustic once a week may be applied. If the excoriated surface be large carron oil liniment, is the best application. When the red points have appeared fading and the exudation has ceased, tar and soothing ointments may be used. Collodion is an excellent application in these cases, especially when a new healthy cuticle is forming. Friction of clothes should be best avoided and children should wear gloves. In chronic cases, if there is infiltration, the parts should be well rubbed on from time to time with soft soap till the skin has become soft. In infiltration without excoriation, citrine ointment is the best application. Where the epidermis is

much thickened, solution of potassa fusa has been used with best results.

Varieties.  
E. capitis.

*Local varieties.*—1. *Eczema capitis* is synonymous with *E. infantile*. It may extend to the external or internal ear. In fat people it invades the skin round the umbilicus. It always attacks hands and feet simultaneously. There is free discharge, hairs glue together, and crusts form. In children remove the hair, apply oil and poultices till the crusts are removed, then apply ointment of benzoic acid and oxide of zinc combined. Tar is also of great value.

E. of the face.

In obstinate cases blister the surface with acetum cantharides. 2. *E. of the face*.—Remove the crusts or the parts covered with soothing ointment. Camphor is a good remedy to relieve itching which always accompanies it.

E. of nostrils.

3. *E. of the nostrils*.—Citrine ointment or solution of nitrate of silver applied with a brush is recommended.

E. of legs.

4. *E. of the legs*.—Apply tar ointment. Bandage the legs

E. of scrotum.

if the veins are varicose. Enjoin perfect rest. 5. *E. of the scrotum or labia*.—Paint it with nitrate of silver.

E. intertrigo.

In most cases lotion of borax and glycerine does good. 6. *E. intertrigo* occurs where opposed surfaces are in contact. *e.g.* Under the mammæ or under flexors of limbs. In these cases the surface should be dusted over with powder of zinc or of starch, and fullers earth. In all cases perseverance and constancy are of utmost importance.

Elephantiasis  
arabum.

*Elephantiasis arabum*, Barbadoes leg (*Bucemia tropica*) is mainly a disease of tropical climates, and more especially of India. It is an hypertrophy of the connective tissue of the lower extremities, penis, and scrotum, and is frequently attended with inflammation of the surrounding lymphatics. It is said to be due to long residence in warm or malarious and damp localities; or to the long-continued use of exclusively fish diet. The parts affected are hard, and the skin and connective tissue hypertrophied. There is also superficial redness and general infiltration of tissues. The

superficial veins and lymphatics are cord-like, red, and painful; on incision into the leg a large quantity of yellow fluid escapes, which soon coagulates. It is subject to frequent recurrences. In chronic cases the skin becomes warty, papular, or studded with nodular elevations, sometimes it ulcerates. It may desquamate, or become thick and horny, as in ichthyosis, or may remain congested, anæmic, and livid. *Treatment.*—Ligature to the large artery, digital compression to the main branch, have all been tried, but have failed. Sometimes a change to a mountainous place has in recent cases met with perfect success. Avoid over-fatigue. Prevent injury, or irritation of the part. Keep it evenly and firmly bandaged, or under elastic stockings; scabs and crusts may be removed by cataplasms or any greasy application. If the disease is localised to the scrotum free incisions often give relief. Treatment.

*Epithelial cancer* consists of a hard, indurated lump, which attacks generally the lower lip. The mass soon becomes ulcerated and cracks. The ulcer always has an unhealthy look, and its edges are everted and indurated. The disease attacks elderly persons. Its progress is very rapid. Free excision and caustics are the best remedies. Epithelial cancer.

*Erysipelas* is an intense hyperæmia of the cutis, with profuse serous transudation into the subcutaneous areolar tissue. The lymphatic vessels, glands, and veins, are always implicated, and there is a tendency to form small abscesses. There are often small hæmorrhages into the skin. The affection may end in gangrene. It may be due to extension of inflammation from the walls of the lymphatic vessels into the surrounding skin; to inoculation of some acrid or venomous material; to absorption of ichorous secretion of a wound; or to exanthematic causes. Is more apt to occur in warm weather than in cold; in the poor and in those who indulge in excesses, than in the rich and sober. A previous attack predisposes to it. It is epidemic. Erysipelas.



## Pathology.

*Pathology.*—Some say that the disease is not a specific fever; it is a local manifestation in the same sense as inflammation of the lung is; and like other inflammations it does recur any number of times, and it is also contagious like catarrh and ophthalmia. Others maintain that the existence of a short stage of incubation, the presence of enlarged and tender lymphatic glands before eruption appears, the existence of bacteria in the lymphatic glands and other inflamed tissues, its inoculation in other animals, and the resemblance of its symptoms with those of specific fevers, show that it is a specific fever. Erysipelas may be simple and affect the skin alone, or phlegmonous and affect the skin and subcutaneous tissues. *Morbid anatomy.*—

In the early stage there is a circumscribed blush of vivid redness, which fades on pressure; the cutis and subcutaneous tissue contain lymph exudation and corpuscles. The patch soon becomes thick, hard, and brawny, and its margins are well defined. In some cases we find tender and red lines extending from the patch to the neighbouring lymphatics, which are also inflamed and painful. The patches coalesce, and thus increase their area, and in some cases they occupy the whole body. The parts first affected soon undergo resolution and desquamate. Occasionally erysipelas disappears in one part and breaks out at another. It may lead to effusion into the subcutaneous tissue, as is seen in eyelids and scrotum, or to suppuration, as in erysipelas of the face and head. Sometimes the skin sloughs; rarely it runs on to gangrene. Very often in erysipelas vesicles or bullæ form over the skin. Erysipelas often extends by continuity to the subjacent organs. Thus, in case of the neck, œdema of the glottis, that of the head, inflammation of the meninges, and of the trunk the peritoneal inflammation occurs. The inflammation of the veins in the neighbourhood of erysipelas, and even pyæmia are common complications. *Symptoms* are those of local inflammation,

## Symptoms.

of inflammatory fever, and of intercurrent inflammatory lesions. In idiopathic cases there may be indisposition for a few hours, or only rigors, followed by the appearance of an erysipelatous patch on some part of the face, and also fever and sore-throat. In some cases the patch appears on the second or the third day after the attack. The patch appears as a circumscribed red spot on one side of the nose, and gradually extends and covers the scalp, neck, and shoulders. It is also accompanied by pain and tenderness. The eyelids are swollen and puffy, and there is burning pain and scratching. If on the face, all trace of natural features is lost. The neighbouring lymphatic glands are enlarged and swollen. The temperature is high. The disease may end in recovery or death. In unfavorable cases the eruption is of a dark red colour, the skin over it hot and painful, and dark vesicles and bullæ are formed. In some cases sloughing, or suppuration and gangrene occurs. Fever increases towards evenings. The temperature rises from  $99^{\circ}$  to  $105^{\circ}$ . Pulse is 120. The tongue is furred and there is stomatitis, and also glossitis. In such cases urine is generally scanty and contains albumen, the urea is increased and chlorides diminished. There is delirium with nausea, vomiting, and diarrhœa, and low typhoid symptoms, often ending in death by exhaustion or coma. In cases of recovery redness disappears in three or four days, swellings subside, pain abates, blebs dry up, and the skin begins to desquamate. Eyes, ears, hairy scalp, and part of the throat are usually attacked, but rarely the back of the neck or trunk. The whole duration is about a week. In case of the scalp, hairs usually come out, but there is no permanent injury to hair follicles, hence the baldness is soon repaired. Where suppuration occurs puncture of the abscesses is always followed by speedy recovery. Gangrene occurs only in surgical cases. In them the fever is asthenic. Pulse small, temperature

high, with intense prostration. *Complications*.—Bronchial or intestinal catarrh, and hyperæmia of the kidneys.

Erysipelas  
neonatorum.

*Erysipelas neonatorum* is very fatal. Is due to epidemic influences and is formidable like all other puerperal affections. It generally begins at the pubes, which becomes red, hard, and shining. The child cries, is restless, and sleepless. *Diagnosis*.—From scarlet fever, measles, erythema,

Scarlet fever.

and smallpox. In *scarlet fever* the redness is localised, and is preceded or accompanied by sore throat. In *measles*

Measles.

there are nasal and catarrhal symptoms. In *erythema* there is absence of fever, of inflammation of deeper parts, and of implication of glands. Erythema does not affect

Erythema.

Smallpox.

the face or head, and there are no vesications. In *smallpox* the pustules are not solitary. Several may be seen in other parts of the body, and there are premonitory symptoms, as vomiting, pain in the back, &c. *Prognosis*.—Is

dangerous if the disease spreads extensively, and also into the areolar tissue. The adynamic symptoms which set in in the course of the disease are fatal from asthenia.

*Treatment*.—Rest and free ventilation are necessary. The part affected should be well fomented with warm water. Anodyne poultices are recommended. The part should be dusted over with violet or rice powder, or covered with collodion. If tension be great punctures may be tried. The patient should have nourishing diet and cooling drinks. Stimulants and preparations of iron may be given.

Erythema

*Erythema*.—Includes *E. simplex*, *E. intertrigo*, and *E. multiforme*. It is an active congestion of the skin, attended with redness and slight swelling. It often spreads, and is frequently erratic. *Erythema simplex*.—In this

variety there is slight but well defined swelling and redness of the skin. It is excited by local irritants, as parasites, it is produced by tension from dropsy, by scratching, or by under clothing, or by heat, or cold. A variety of *E.*

simplex is commonly known as *ptyriasis simplex*, and occurs on lips, chin, &c. In the latter the patches are covered with branny scurfs. When erythema occurs in hairy scalp it is called *ptyriasis capitis*, or dandriff. *E. Intertrigo* is produced by rubbing together of two folds of skin, *e. g.*, breasts in women, arm pits, or groins. In them it is accompanied by a greasy discharge. It may also be produced by application of a mustard plaster, or by constant flow from the nostrils, or of saliva, or tear, or of urine, as in vesical fistula. *E. multiforme* is often associated with rheumatism. In it the swelling and effusions form nodules, hence *E. multiforme* is also known as *E. nodosum*. It sets in with headache, and fever, and after a time red prominent blotches appear on hands, arms, legs, and trunk. These soon become knotty from effusions, and end in desquamation. The swelling is of the size of a walnut, oblong, and slightly raised. Is an infiltration accompanied by extravasation of blood. It has a boggy feel in the centre. Is of a light red colour at first, but soon becomes dark, then changes into blue, and fades into yellow like a bruise, hence called *dermatitis contusiformis*. Seat, front of both legs. The swelling is tender on pressure. Fresh crops succeed each other. It is common in girls. Is often associated with inflammation of the lymphatics. There is very little itching or tendency to formation of vesicles as in eczema. It is generally superficial, and may be diffuse or circumscribed. When diffuse it spreads at the edges, and invades the normal skin. It also spreads along the course of the lymphatics. *E. nodosum* is often followed by degeneration and pigmentation. The disease generally gets well, leaving a slight pigmentary tint behind. In *E. nodosum* there are distinct patches of inflammation, and the eruption is symmetrical on both sides of the body. In *E. multiforme* the seat of the eruption is on the back of the hands and on dorsum of the feet. *Varieties*.—These are

E. simplex.

E. multiforme.

E. nodosum.



named after the shape of the eruption. Thus, *E. papulatum*, *E. circinatum*, *E. iris*, *E. marginatum*, or *E. gyratum*.

1. *E. papulatum* is a small, flat, circular elevation of the cutis, and attended with itching. 2. *E. circinatum* is an advanced stage of *E. papulatum*. In this the elevation or wheal increases at the periphery, forming a congested, tumid swelling or ring, the central part becoming healthy. 3. *E. iris* consists of several concentric circular elevations separated by healthy skin between them. These rings frequently break up and form irregular and tortuous ringlets. The affection is seated on the back of hands and wrists, and on calves and ankles. It is often associated with gout or rheumatism. 4. *E. marginatum* or *gyratum*, in it the elevations coalescing form large patches, each patch having a tendency to heal in the centre, and to extend towards the margin of the patch where congestion is prominent. The eruptions often occur in crops, and last from four to ten days, ending in desquamation. When the vesicles appear on the surface of the patches, the eruption is called *herpes*; where bullæ are formed it is then called *pemphigus*. *Diagnosis*.—Erythema resembles roseola, urticaria, and pityriasis. They all consist of a slight superficial and short-lived inflammation, and end in scurf-like desquamation. They are never contagious. In *erythema* there is uniform redness of the affected portion of the skin; in *roseola* the redness is variously figured, and is of a rose colour; in *urticaria* the wheals always accompany them; in *pityriasis* there is desquamation of the cutis. *Treatment*.—Soothing remedies, as Lotio Plumbi, and in erythema intertrigo absorbents are best applications. The diathesis must be removed or modified.

#### Fibroma.

*Fibroma* is an outgrowth of fibrous tissue covered by integument, which is often pedunculated. It varies in size from a pea to a walnut. Sometimes the tumour ulcerates. *Treatment*.—Remove by the knife or by a ligature.

*Herpes* is a circumscribed inflammation and affects the most superficial layers of the skin. The epidermis is elevated by exudation. It is characterised by a group of distinct vesicles situated on an inflamed base. Their contents soon become milky, they dry up, and form scabs within a week. The crusts leave only a reddish stain behind. Their chief cause is irritation of sensory nerves. There is a good deal of smarting pain, tension, and fever. It may be idiopathic, and may be general or local. The general form is rare and begins by fever, followed by eruption on the inside of the mouth and throat. The localised form is common in lips, prepuce, and course of intercostal nerves. The idiopathic occurs in the course of fevers. It has received different names according to the form, seat, and appearance of the eruption. Thus *zona* or *herpes zoster* (shingles) is made up of several patches of herpes, and is distributed along the course of a nerve. Is unilateral in its extent, and appears in crops, and occurs only once in life. It is associated with a morbid condition of the cerebro-spinal nerves; neuralgic pains precede the eruptions. Its most frequent seat is the chest or abdomen, or the course of the intercostal nerves, but may affect many other nerves, and extend from the vertebræ to the sternum. *Herpes labialis*.—Differs from *H. zoster* in which there is only one crop of vesicles; and occurs any number of times. *H. labialis* is a common accompaniment of catarrhal affections and pneumonia. It is not unilateral as the herpes zoster. *Herpes iris*.—This is characterised by a vesicle with surrounding concentric rings of herpes, the vesicle is of the colour of a fading bruise. The eruption is seated on the back of the hand, wrists, and knees. *Herpes circinatus* is a ring of vesicles chiefly at the circumference, while the centre portion is in a healthy condition; eruptions of fevers and of ringworms are of this kind. The French called this variety *hydroa*. The same term also

Herpes.

Idiopathic.

Herpes  
zoster.

H. labialis.

H. iris.

H. circinatus.

applies to the bullous eruption produced by iodide of potassium. It also occurs in gouty people. *Diagnosis*.—Herpes and pemphigus are confounded with one another. Both are vesicular, and have close affinity with erythema multiforme. May develop upon erythematous patches, and may be like different forms of erythema, circinate, gyrate, or marginate. All these varieties represent the same affection in successive stages. *Treatment*.—Locally soothing ointments or poultices followed by absorbents and liquor arsenicalis internally are useful. Protect the eruptions from rubbing together by covering the part with cotton wool.

Hyperidrosis.

*Hyperidrosis or excessive sweating* occurs during convalescence from fevers or rheumatism, and is common as a part of hectic fever. May be a natural defect, and hands and feet often perspire. May be general or local. The skin of the head, axilla, hands, feet, and genitals is chiefly affected. In some cases it may be confined to lateral half of the body, and is then due to a morbid condition of the nervous system. *Treatment*.—It is only palliative. Locally sponge the parts with sulphuric acid lotion. When due to derangement of the nervous system belladonna liniment does good. Some recommend with benefit to wrap the feet with linseed poultices.

Hydroadenitis.

*Hydroadenitis* is an inflammation of the sweat glands. It appears as small lumps, like blind boils, which are of a dull red colour, tender and painful on pressure, and resemble acne indurata, but they have no central pustular point. *Treatment*.—Allay the local irritation by soothing remedies, and subsequently paint the lumps with collodion or acid nitrate of mercury, or try subcutaneous puncture.

Ichthyosis.

*Ichthyosis* is characterised by the presence of black, dried crusts resembling masses of dried mud. It is two or three lines in depth, and firmly adherent. In it there is deficiency or absence of sebaceous secretion, and more or less tendency for conversion of the epithelium into seba-

aceous follicles. The affection is congenital, and appears during the first two years of life. As age advances it becomes well marked. The skin of the hands, arms, elbows, and knees is dry and harsh, and the epidermis comes off in flakes. In some cases the papillæ are enlarged, and the sebaceous glands are filled with fatty matter. The cakes are formed of hypertrophied skin and enlarged papillæ, or of cuticular scales mixed with sebum. The patients are feeble and emaciated, and often liable to eczema and impetigo. A similar condition occurs in the course of chronic and wasting diseases, as phthisis, and in advanced years, and is known as *xeroderma*. *Treatment*.—The affection is almost incurable. Free oiling and rubbing the part with glycerine, or grease, or neats-foot oil gives relief.

*Impetigo* is a pustular variety of eczema. May commence as vesicles. Is contagious, sometimes epidemic, mostly sporadic. Attacks children, as a rule. The pustules are found between the cutis vera and the epidermis, or between the epidermis and the rete mucosum. They vary in size from a mustard-seed to a pearl, are round or oval, are superficial, have no hard base, as in *erythema*, and are not painful. The scabs that form are yellowish in colour, thicker and darker than those of eczema, and when removed the surface underneath is either red or eroded, and the surrounding skin undermined. When healed they leave permanent cicatrices behind. Each spot runs a definite course for a week or ten days. It is called *Impetigo sparsa* when the pustules come out singly, and *Impetigo figurata* where they form groups. In children it is common on the head and face, and in them when abundant it is called *Impetigo larvalis* or porrigo larvalis. Where it attacks the hairy part of the face it is called *sycosis*. *Treatment*.—In the early stage, cooling lotions are useful. The scabs when formed should be removed by poultices, or by oil or by soothing ointments.



After removal apply zinc or mercurial ointment. The health must be improved by tonics and cod-liver oil.

Keloid.

*Keloid* signifies a scar; it is characterised by a gradual development of round and reticulate patches, and appears as an outgrowth of fibro-cellular tissue of the cutis. There are two forms, idiopathic and traumatic. The *idiopathic* occurs as a firm nodule on the skin, of a pale colour, and sends out processes which contract and pucker in the skin around the central mass. They are seated chiefly on the chest. The *traumatic* form develops in old scars from burns, or follow the use of the knife or of acids. It sends out claw-like processes; and hence the name. They never ulcerate or form scabs; often disappear spontaneously.

Lepra.

*Lepra* is an old term for psoriasis, and oftener affects the extended than the flexed side of the limbs. Nails suffer from lepra, but not the hairs. When the eruption disappears it leaves no cicatrices, only a brownish coloured taint. Is common with scrofulous children. Is not attended with itching. When it affects the gouty and the aged, and is accompanied with severe itching, it is called *psoriasis*. It consists of circular rings. May be limited or general. It often disappears in two or three weeks, but may persist for years. The affection is hereditary; has a remarkable tendency to break out simultaneously in corresponding situations on both sides of the

Diagnosis.

body. *Diagnosis*.—From *eczema*. Both consist of scabs, and are attended with itching, but in *eczema* there is no exudation, and it is chiefly located in the extensors of elbows and below the knees. *Treatment*.—If the patient be dyspeptic avoid stimulants and coffee. Arsenic may be used as a specific in these cases. In gouty persons colchicum may be tried. Locally use oil and poultices, or vapour baths; glycerine with zinc oxydum, apply three times a day; often tar ointment may be used. In slight cases

pencil the eruption with corrosive sublimate. Some use wet sheets over the parts with benefit.

*Leprosy* is a specific disease of the blood, is endemic in Leprosy. many parts of the world, and is well known in India. It is not contagious, the attendants on the sick never get it, nor sexual cohabitation give it to the healthy. The disease is, however, hereditary, as cancer or tubercle, and like it is undoubtedly transmissible. It is characterised by the development of nodules upon the skin, mucous membranes, and nerves, leading to altered sensibility of the part affected. The nodules give rise to pain, numbness, anæsthesia, or to paralysis. They also diminish or even destroy the nutrition of the affected part, and lead to ulceration, mortification, or gangrene. The natives of India look upon the malady as a punishment from God, and as such regard it with great awe and superstition. It has a close pathological relation to syphilis, and since the introduction of the Contagious Diseases Act in Europe leprosy is not known among a great portion of her population. It still occupies a chosen habitat in China, India, and South America. The disease is most prevalent among the poor and badly fed or badly clad than among the well-to-do and cleanly. Some attribute it to the use of decomposing fish, but the Banias and Hindoos (brahmins), who are pure vegetarians, are not exempt from it. Its prevalence in Australia and Sandwich Islands shows that it may be capable of development from excreta of lepers. It is a disease of adult life. The patient may often suffer for months or even years without any local manifestation of the symptoms. In the beginning there may be depression of nervous energies, feebleness of general circulation and of nutrition. After a time scattered livid blotches appear over the skin, which, remaining for a few days or weeks, either fade or disappear to be followed by fresh crops. The blotches are tender, irregular, and elevated, varying

in size from a few lines to one or two inches in diameter. Very often the skin is slightly depressed in the centre of the patch, while at the periphery the disease is more and more extended. Where the blotches are colourless the patch is known as *white* leprosy, but where the exudation resembles psoriasis or acne the affection is known as *macular* leprosy. When the affection is confined to the nerves it is recognised as *anæsthetic* leprosy, but if the skin, mucous membrane, and nerves are affected together it is called *tubercular* leprosy. In *tubercular* leprosy we find nodules attached by broad bases, and each nodule coalesced with its fellow. They are hard, of a brown colour, and somewhat translucent. There is very little pain. After a time they undergo degenerations and soften; often, owing to some external irritation or to the action of air, they become irritated, excoriated, and ulcerated. The cutaneous glands situated upon these nodules disappear, the hairs become thin, dry, and lose their colour. The tubercles are chiefly seated in the limbs and face. On the face they attack in preference the nose, lobes of the ear, lips, and eyelids or eyebrows. The nodules on the face give it the character of a morose expression. The disease often extends from the skin to the mucous membranes, and nodules appear in the mouth and larynx. The *anæsthetic* variety is known by impairment of general sensibility of the affected skin. There may be increased sensibility at some points or parts, and diminished at others. Very often those parts which for some time were benumbed feel highly sensitive. It may occupy several scattered spots or a large area of skin. Where the motor nerves become affected, tremblings or jerkings, or even paralysis and wasting of the limbs occur. Bullæ very frequently form which, bursting, leave ulcers, or ulcers having healed leave cicatrices. The disease may run on to sloughing or gangrene, and there may be loss of fingers or toes, or even of a hand or of a foot. It often

Tubercular.

Anæsthetic.

lasts for years. Death is due to complications, as phthisis, dysentery, or kidney disease, or to asthenia. *White leprosy* or *leucoderma* is a variety of anæsthetic leprosy. The patient is often dyspeptic. It begins as a small discoloured point over the exposed parts of the skin, and chiefly the neck, and then extends and forms patches. The scattered patches sooner or later coalesce, and thus, in some cases, the whole body may become affected. White leprosy.

*Pathology.* — There is proliferation of connective tissue corpuscles; the affected tissues are infiltrated with giant cells, and they contain very few blood-vessels and very little blood. The *tubercular* variety generally invades the skin round the hair follicles and glands. The nodules ultimately lead to destruction of these follicles and glands. In the *anæsthetic* variety the nerves are implicated, they swell and become firm owing to the proliferation of cells of the connective tissue of nerves. They often undergo degeneration. Pathology.

*Prognosis.*—In the anæsthetic variety the disease is often short lived, its further spread prevented, and patients are said to be cured. In favorable cases a single healthy coloured point, or several coloured points, appear in the patch or patches. These soon grow, become wider, and coalescing, fill the whole patch with a healthy colour. Where the disease is allowed to go on for some time, or where the patient indulges in luxurious diet and in drinks, it rapidly spreads and causes great disfigurement of the body. Prognosis.

*Treatment.*—Remove the patient from a locality where the disease is endemic, protect the skin from the injurious influences of air and accidents, maintain the strength by tonics and by appropriate diet. For leucoderma I have found relief obtained by the external application to the discoloured skin of an extract of fresh bavachee seeds (*Psoralea corylefolia*), and by giving internally the same drug combined with Treatment.



arsenic. The patient should scrupulously avoid high and seasoned dishes and spirituous drinks. For dyspepsia and costiveness infusion of rhubarb may be taken every three or four days. In several cases of white patches an oil expressed from the seeds of *chalmogra* (*Gynocardia odorata*) is used both internally and as an external application.

Lichen.

*Lichen* (moss) is a plastic or papular eruption, and is a variety of eczema. It is characterised by innumerable solid, colourless, or reddish fleshy nodules or papules, each of the size of a mustard seed, and attended with intense itching. May be in scattered papules, *L. simplex*, or in groups, *L. circumscriptus*. When accompanied with scrofulous diathesis it is called *L. scrofulosus*. The disease is always symmetrically placed on both sides. It terminates in desquamation. Its chief seat is the face, back of the hands, neck, and trunk. The affected skin is dry, thick, and muddy. When papules attack hair follicles they generally appear dotted, and resemble eczema. Patient gets emaciated and dies from exhaustion.

Treatment.

*Treatment*.—Purgatives are useful. In chronic cases Donovan's solution, quinine, or arsenic may be given internally. Alkaline lotions often relieve the irritation. If the papillæ appear indolent use absorbents.

Lupus.

*Lupus*.—Is a formation of a neoplasm. It takes the form of tubercles or of an infiltration, and thus destroys the true skin. The neoplasm undergoes degeneration, and thereby leads to atrophy and scarring. Lupus is a specific outgrowth of the cutis, takes a prolonged course and ends in the formation of indelible cicatrices. It commences with congestion and hypertrophy of the skin. The epidermis is thin, and covered with fine scales. The hairs are deformed and fall off, the neoplasm penetrates deeper and deeper, and even attacks cartilages and bones. Ulceration often sets in, and necrosis forms and the tissues break down and form devouring ulcers, *e. g.* lupus exedens;

often the nodules subside, they undergo fatty degeneration, and are absorbed, or they become depressed, and are marked by deep scars, *e. g.* *Lupus nonexedens*. *Varieties*.—

1. *Lupus Erythematosus*.—Is a diffuse form, and appears on cheeks of young women. It is confined to the skin, and to the mucous membrane of the nose, mouth, and fauces. In it the sebaceous glands are especially involved, and they stud the infiltrated surface. 2. *Lupus tuberculosus*.—The neoplasm forms a distinct fleshy mass. When the neoplasm does not ulcerate it is called *Lupus nonexedens*. 3. *Lupus exedens*.—The neoplasm ulcerates freely, and attacks nose and cheeks. It consists of small painless nodules, which are hard, tender, and bleed readily. They soon multiply, and become tense, shining, and covered with detached scales. In favourable cases after a time the hardness is dissolved, the skin sinks and becomes firmly attached to the parts beneath, and is often changed into a white cicatrix. This transition is known as *Lupus nonexedens*. 4. *Lupus impetiginosus* simulates *impetigo*. It is limited to the face, and consists of discrete tubercles, which suppurate acutely at their most prominent points, and are covered with dark hard scars which remain fixed for weeks or months. It has a tendency to cicatrize in the centre and spread at the edges; it is often associated with suppuration of scrofulous glands. Is a most destructive form of lupus, it begins on the *alæ nasi*, and is accompanied by a swelling and hyperæmia of the anterior part of the nose; it may begin in the septum of the nose, destroying the nose internally.

*Treatment*.—Remove the growth by caustics as acid, Treatment.  
nitrate of mercury or nitrate of silver; caustics are inapplicable if there is tendency for the lupus to spread rapidly. Their use is to be followed by poultices; health should be improved by cod liver oil; slight cases need only astringent applications combined with sedatives. As there is tendency

for the disease to cicatrize in the centre and spread at the edges, the caustic should be freely applied at the margins. Some cases recover under a blister, others improve under tar ointment.

Medicinal  
rashes.

*Medicinal rashes.*—*Arsenic* is said to excite herpes zoster, induce hardness of the palms of the hands, and ulceration of the skin, as in flower-workers. *Iodide of potassium* leads to acne, and to disseminate bullæ over the surface. *Bromide of potassium* to acne, erythema, retention of sebum, and inflammation of the sebaceous glands. *Tar* to comedo and acne. *Copaiba* to pruritic rash and wheals.

Malaria.

*Malaria* (millet seed).—Is an inflammation of the sweat follicles. In it the sudamina are increased in quantity. The eruption is common in hot weather, and occurs as red pimples, which are scattered in the form of a rash. It occurs as vesicles as in acute fevers, and is often symptomatic of pyæmia; the vesicles are not surrounded by a red areola, and do not contain clear fluid as in eczema, but are yellow and puriform. *Treatment.*—Regulate the diet; use locally cooling lotions and warm baths.

Molluscum  
contagiosum.

*Molluscum contagiosum.*—In this affection the sebaceous glands and the parts around are enlarged, and distended by an excessive quantity of sebum, so that sessile little tumours are produced, which are umbilicated and disclose the distended openings of the gland ducts. In size they vary from a pin's head to a split pea. On squeezing a white cheesy matter escapes. It is epidemic, and sometimes contagious; appears mostly on the face. It mainly occurs in children. Is unattended with pain or itching. *Treatment.*—The vesicles should be punctured and poulticed; if attached by narrow bases snip them off, if by broad bases cauterise them.

Morphæa.

*Morphæa* is the formation in the skin of a white, wax-like, slightly elevated induration, which is firm, dense, and opaque, and surrounded by a black coloured ring of

vessels; it is a kind of fibroid degeneration, seated on the trunk, limbs, and face. It attacks weak females. The course is very protracted; it is sometimes associated with scleroderma. It is a very rare affection.

*Maculæ*.—There are four forms. 1. Pigmentary, Maculæ. occurring idiopathically, as in leucoderma, or symptomatically, as in connection with uterine excitation, cachexia or after certain eruptions. 2. Parasitic, as in *Tinea versicolor*. 3. Chemical, as due to nitrate of silver. 4. Hæmorrhagic, as in purpura.

*Onychia*.—Onychia or the nail bed is an affection in Onychia. which the maxtrix becomes inflamed. Is most common in children under a year old. There is pain, redness, discharge of pus round the nail, ulceration of the matrix and temporary loss of the nail. When met with in adults there is at the root of the nail a semilunar furrow which extends across it, which as the nail grows is pushed further and further on. The nail itself is dry and brittle in texture. Onychia may be strumous or erysipelatous in origin. *Onychomycosis*.—In it the nails are thickened, rendered brittle, and raised from the bed by an attack of fungi. Often only one nail is affected. *In psoriasis* the nails of the hands, and perhaps of the feet, are affected. In it the nails at first are speckled, then become opaque, dull, uneven, and brittle, and split up into several layers, and there is psoriasis about the body. *Treatment*.—Consists in the application of black wash externally, and iodide of potassium internally. For non-syphilitic affection soaking the nail in a lotion of sulphur will suffice.

*Parasites in skin diseases*.—These comprise animal Parasites. parasites, as scabies, phthiriasis, eruptions due to gnat bites, fleas, &c. *Vegetable parasites*.—*Tinea favosa* caused by a fungus called *Oidium Schönlenii*. *T. tonsurans* or ordinary ringworm, *T. circinata*, Chinese ringworm or Malabar itch, and *T. kerion*, all caused by the *Trychophyton*



*tonsurans*. *T. versicolor*, or chloasma, or pityriasis versicolor is caused by the *Microsporon furfur*. *T. decalvans* or alopecia is caused by the *Microsporon Audouini*, and *Mycetoma* or madura foot is caused by the *Chionyphe Carteri*. Each affection is described under its respective heading.

Pigmentary  
diseases.

*Pigmentary diseases of the skin* are those in which the pigment is in excess, and those in which it is deficient. The agency of light and heat or frequent exposure to a bright sun has a marked effect in increasing the colouring matter of the skin, and that of the hair. In *albinos* the skin and hair are deficient in pigment, and the eyes are pink owing to want of pigment in the choroid. Very often yellowish spots, called *freckles*, are found on the face, neck, and arms. Heat without light often increases the formation of pigment in persons who keep themselves constantly near the fire. In pregnancy and during menstruation there is an extra deposit of pigment on the areola of the breasts. Very often pigment spots are congenital, and known as *liver spots*. These are of a yellowish or fawn colour. Pigment spots may be due to syphilis, psoriasis, pemphigus, and eczema, or to long-continued scratching or irritation. In Addison's disease the bronzing of the skin is common. Increased pigmentation or brown discoloration of the skin is met with in persons who have taken nitrate of silver for a long time. *Leucoderma* is hereditary and is characterised by a partial loss of pigment.

Pemphigus.

*Pemphigus*, a bladder or water bubble, is an inflammation of the skin attended with large oval blebs or bullæ. It is a fully developed stage of herpes iris or of herpes circinatus. It is associated with an irregular patch of erythema over which the vesicles, coalescing, form bullæ, or sinuous or gyrate bulbous bands. The blebs are filled with clear fluid. It occurs in newborn children, and is generally syphilitic. It appears on the belly, back, and extremities,

like red spots, which itch and burn considerably. They are of various sizes, and contain an albuminous fluid, known as bullarum liquor, which consists of albumen, water, and a little fat. The specific gravity is 1010, and has an acid reaction. The vesicles burst, and in two or three days form yellowish crusts, which leave an ulcerated surface or purple stain behind. Generally children die. In such cases small doses of Donovan's solution, or of arsenic internally, and zinc ointment, with a little calomel, locally, are useful.

*Phthiriasis or prurigo senilis.*—Is caused by pediculus Lousiness.  
vestimenti. *Varieties.*—1. Pediculus capitis affects the head, and appears as a dark streak of a grey colour, like that of the scurf. Is found deep into the roots of hairs; it causes intense itching, and after scratching forms scabs; it often leads to peculiar hæmorrhagic specks. Is always due to want of cleanliness. 2. Pediculus vestimenti or body louse lies concealed in underclothing, and is often detected crawling upon the skin or the clothes. It causes itching, and after violent scratching, leads to papular eruptions, resembling prurigo, lichen, urticaria, or eczema. 3. Pediculus pubes infest the hairs of the pubes, and in it the irritation is considerable. *Treatment.*—Warm baths and parasitocides are the only remedies. Decoction of staphisagria seeds, or of seeds of cocculus indicus (kakmari) is useful. Remove the hair and crusts by oiling and poulticing; also use weak lotion of corrosive sublimate, oil of turpentine, or creasote ointment.

*Purpura* is a variety of cutaneous hæmorrhage. Purpura.  
*Purpura simplex* exists as reddish, or indigo coloured, small, extravasated patches, varying in size from pin points to large blotches, and each having an irregular outline. The patches are at first bright red then become darker, and fading into a light yellow, ultimately disappear by absorption. The spots are not removed by pressure. Fever often accompanies the disease. In *purpura hæmorrhagica* prostration

often accompanies the disease. It suddenly shows itself by the presence of petechiæ on the skin and of hæmorrhages from the mucous membranes of the body, as the nose, mouth, kidneys, bowels and bladder; sometimes the loss of blood is so great as to imperil life. *Treatment*.—Astringents (vascular) are the only remedies useful in these cases. Ergot and turpentine in full doses may be given with advantage.

Pityriasis.

*Pityriasis* (bran) is closely related to psoriasis. It consists of shedding of scales in form of brawny desquamation. It may be the result of malnutrition or of local irritation. *Pityriasis rubra*.—It is a severe and incurable disease. Is one form of eczema, and begins as a red scaly spot which rapidly spreads. The face is generally flushed and covered with scales, and the scalp even desquamates. *Treatment*.—Locally, oil and astringent applications are best. Internally, iron or phosphorus is found to be highly beneficial.

Prurigo.

*Prurigo*.—Is a scaly eruption or excoriations due to scratching, ~~on~~ to pediculi. There is development of small hard pale or flesh coloured papules, which are accompanied by intolerable itching. Often confounded with phthiriasis. In *prurigo* the rash is primary, which is secondary in phthiriasis. *Prurigo* is due to pediculi, *phthiriasis* is not. In *prurigo* the papules are the result of chronic inflammation in the papillary layer of the derma, and the disease is seated on the buttocks and on the sides of limbs, and the papules are felt beneath the skin before they are clearly discernible to the eye. *Treatment*.—The clothes should be removed and well cleaned; a warm bath is necessary. Arsenic should be given internally, and the state of general health improved.

Pruritus.

*Pruritus* or *itching* is a hyperæsthesia of the skin. It may accompany eczema, lichen, prurigo, urticaria, scabies, or phthiriasis. When it arises without any eruption it may be due to imperfect elimination of bile, urea, or uric

acid, by the skin, or to disorder of the nerves, or may be excited by some local irritants, as pediculi about the head and pubes, or by worms about the anus, or by flannel next the skin, &c. In it the skin is altered by considerable itching and scratching. The papillæ and follicles become hyperæmic and prominent, and a drop of blood exudes and dries as a speck. *P. senilis* occurs in old people. Itching, increased by the warmth of the bed at night, with a pimply rash, is suspicious of scabies. When about the shoulders and back of phthiriasis. In cases where the clothes are taken off, especially after perspiration, as towards evenings, the air obtains access to the skin, and itching is considerable. Itching is suspicious of urticaria, or winter pruritus, if it suddenly comes and goes at night, and occurs about the thighs and legs. *Treatment*.—Sedatives are useful for neurotic itching; sulphur is of immense service. When due to retained excreta, aperients are useful. Flannel should not be worn next the skin. Some recommend cyanide of potassium ointment as an application in these cases. When itching is unattended with excoriations, camphor chloral with cold cream is beneficial. *Pruritus pudendi* may be cured by nitrate of silver, aconite ointment.

*Psoriasis* (the itch) or *lepra* is characterised by a round, Psoriasis. small hypertrophous growth of the epithelial layers of the skin, covered with silvery looking white masses of scales on a red and hyperæmic papilla. It is often hereditary. On separating the scabs the cutis leaves slightly excoriated surface beneath. It resembles *Pityriasis capitis* or dandruff. It is a variety of erythema, and, like it, forms brawny scales or scurf. *Seat*.—Elbows, knees, and head. It appears at first as little spots (*P. punctata*), which coalescing form large patches like drops of mortar, *P. guttata*; when of the size of a shilling, *P. circinata*; if serpentine the patches are called *P. gyrata*. It is often mistaken



for syphilitic disease ; but the latter begins in or is limited to the palms of the hand.

*Rhus toxicodendron.*

*Rhus toxicodendron* (vegetable parasite).—The common plant known as *Rhus toxicodendron*, by contact of the hands, face, genitals and about the arms, causes in some persons vesicular inflammation of the skin. *Treatment*.—It is not dangerous. Constant application of lead lotion around, but not upon open vesicles, or of fluid extract of serpentaria, or of oxide of zinc ointment, is recommended. The solution of sulphate of iron may be used with benefit ; of late bromine mxx, olive oil ʒj, mixed and rubbed over the parts has good effects.

*Rodent ulcer.*

*Rodent ulcer* occurs in old people. It appears as a small tubercle on the face, which, remaining for a long time, breaks and ulcerates, the ulcer being surrounded by hard edges, which are not undermined. There is no cachexia, the glands are not involved, and the surface is clean. There is no pain ; the progress is very slow. *Treatment*.—Free excision and caustics. If once removed it does not return.

*Roseola.*

*Roseola* is a hyperæmia of a rose colour. Is symptomatic of acute fevers, rheumatism, vaccinia, &c. As idiopathic it is common in children with deranged digestion. When general it resembles measles, but this is not attended with catarrh, the eruption is not crescentic, is more rosy, often may be in rings, and is patchy in character. *Treatment*.—Salines, laxatives internally, and cooling applications are good.

*Rupia.*

*Rupia* is characterised by flat, isolated bullæ, lasting longer than in *pemphigus*. They are rarely over half an inch in diameter, and contain a mixture of pus and blood ; when the bullæ dry they produce dark, thick scales, hiding destructive ulceration ; often the crusts increase by additional discharge, which soon dries up. They are consequently thick, conical, and adherent. The disease is always syphilitic ; it resembles *pemphigus*, but in the latter the bullæ are the result of superficial or local disease. In *rupia* the bullæ are

seated on a hard base, slowly increase in size, and are surrounded by a halo of congestion. When the resulting scab is hard they are called *Rupia simplex*, when conical *Rupia prominens*. *Treatment* of the constitution is chiefly required. Locally poultices, to detach the sloughs or scabs, The resulting ulcers heal by stimulating ointments, or by washes or caustics, or by acid nitrate of mercury.

*Scabies or itch* is caused by burrowing in the skin of *Acarus scabiei* or itch mite. It consists of an eruption due to the presence of acari in burrows. The animal always resides at the distal end of the burrow. The burrows, or their tortuous receptacles, are called *cuniculi*. Acari at first cause small white papules or vesicles, or even pustules, and then penetrate the skin either in a straight or curved or irregular line. As they penetrate they deposit eggs in a linear series. May infest nipples or organs of generation, but the head and face are rarely attacked. The affection causes violent scratching, especially at night, and intolerable itching, and a subsequent hyperæmic rash. In cachectics the vesicles and burrows generally suppurate. The secondary rash consists of follicles and papillæ, forming papules or pustules, and resemble ecthyma or urticaria. It is common between the fingers and toes, and on the flexed side of the wrists. Is most common in children, in whom the itching is always worse at night. The itching gives rise to the formation of vesicles, which on bursting, the fluid dries up, and forms crusts. The discharge often contains eggs which, by coming in contact with any other part of the body, or with any other person who may sleep with or nurse the child, propagates the disease. *Treatment*.—Locally apply to the skin petroleum, or ointment of sulphur, and of iodide of potassium. Sulphur-baths are also said to be highly useful. Often long-continued use of sulphur may cause eczema, and the itching from it may

therefore be mistaken for scabies. In them application of zinc and camphor, or of oxide of zinc and calamine powder, may be employed. Storax ointment with a little of iodide of potassium is also very effectual.

Scleroderma.

*Scleroderma*.—Is due to an hypertrophy of fibro-cellular tissue, with collection of cells in sheaths of lymphatic vessels, and to infiltration by coagulable fluid. The disease may last for months or years. Women suffer more than men. It resembles in its early stage lichen rubra, or elephantiasis Græcorum. *Characters*.—The patch is stiff at first, then becomes hard and leather-like, and is seated in the nape of the neck or in front of the chest or limb. It often takes the form of bands, and may be raised and yellowish-looking. It often interferes with movements of the face. It is attended with tingling, sometimes with anæsthesia, and is apt to become desquamated and tubercular or ulcerated. It often leaves behind a brownish discoloration with atrophy of the skin and cicatrices.

Sebaceous  
follicles and  
glands.

*Sebaceous follicles and glands*.—In most affections of the skin, the sebaceous glands of the part share in inflammation. In acne the inflammation has a tendency to spread to the neighbouring glands, and hence in acne there is retention of secretion. When the inflammation of the glands is attended with increased secretion and flow, it is called *seborrhœa*. In children *seborrhœa* is due to want of cleanliness, and consists of excessive secretion of sebum, which is more or less oily, and gives rise to a greasy skin. *S. oleosa*.—When the sebum is solid it constitutes dandriff or scurf. The scurf consists of dry, fatty plates, or of greasy dirty white flat scales, which can be easily detached, exposing slightly red and non-excoriated skin below. The hairs generally fall off in this affection. *Seat*.—Head and face. *Treatment*.—Internally, tonics, arsenic, and cod-liver oil. Locally, get rid of the accumulated sebaceous secretion by oil or soap and water.

*Strophulus*, or *red gum*, or *tooth rash*.—Is a variety of Strophulus. eczema, and consists of vesicles or papules scattered, or diffused, or collected in groups upon a reddened skin. It may be due to hyperæmic papillæ, or to distension of sweat or sebaceous glands. It is common in infants, and is seated on the face and arms. It is said to be due to the child being kept very much wrapped up and so overheated. Derangement of the stomach adds greatly to this affection. It occurs in infants only a few weeks old, and generally disappears without any treatment.

*Subcutaneous extravasations*.—Fleas, bugs, and gnats Subcutaneous extravasations. are most common animalculæ in India; they give rise to subcutaneous extravasations of blood in almost every case. A *flea-bite* is a black punctiform swelling surrounded by a blood-rosy areola. People of poor classes and those who do not keep cleanly are thickly covered by them. In it the spots are small and uniform, and on close inspection we can detect punctures; it is thus readily distinguished from typhus eruption. In flea-bite there is itching from the first, and often followed by surrounding œdema or formation of tubercles or wheals. Occasionally vesicles, and even pustules are formed. The same results may be due to gnat-bites, and may occur in case of bugs. The *bugs* among the Hindoo populace from religious prejudices are allowed a free scope in their beds, pillows, and bedsteads, and thus they often do great ravages upon their skin; they are extremely indifferent for their abode. The *gnats* select exposed places, and the *fleas* those spots of skin which are protected by the clothing. The mosquito bites among the Indians are much more common. In all these cases there is violent itching.

*Sudamina (miliaria)*.—Consists of vesicles which are Sudamina. formed by the distension of the upper layer of the cuticle by sweat. It occurs in pneumonia, in rheumatism, and in persons who are perspiring profusely, or in those whose



skin is dry at first and then begins to perspire; this occurs during convalescence from fevers, or rheumatism, or by keeping the body too warm. It generally ends in desquamation. Are seated on the clavicles, neck, face, or thighs. The vesicles disappear of their own accord.

Sycosis.

*Sycosis* is an inflammation of the sebaceous gland and of deep-seated hair follicles of the beard and whiskers. The cutis about these glands and follicles is inflamed, hyperæmic, and infiltrated, and may end in suppuration. It may be idiopathic. *Sycosis simplex*, or secondary to vegetable parasite. *Tinea sycosis*.—Dirty razors often cause it. *Simplex* begins with a sense of heat, pain, and tension, and is accompanied by red infiltrated nodules between the hairs of the beard. After a while pustules, penetrated by a hair, appear on the top of the nodules. These burst, there is profuse discharge, and they dry into brownish crusts. In strumous subjects it runs a chronic course, and in such cases loss of hair may result. *Treatment*.—Soften and remove scabs by rubbing with oil. Shave daily. All pustules to be opened with a scalpel. If very obstinate in healing touch the opened pustules with acetic acid or by corrosive sublimate. During the night cover the affected part with a rag smeared with white precipitate ointment.

Tinea.

*Tinea or vegetable parasitic diseases*.—*Tinea favosa* or *favus* (honey-comb); is caused by a fungus (*Oidium Schönlenii*). It is contagious, and is often due to uncleanness or dirt. The fungi coalesce and smell like mice. The favus is common in children, and is very chronic. It appears on the hairy part of the scalp as small yellow and cupped bodies, of the pin's-head size, each being perforated by a hair. The spores are developed in the funnel-shaped mouth of a hair-follicle, and they elevate the epidermis around the hair. When numerous they coalesce, and cover the outer scalp, and thus concave spots like crab-eyes are formed. The convex surface of each crust is imbedded in a depression

in the atrophied cutis, while the upper or concave surface is formed of elevated edges with a depressed centre. The scab is thick and dry, consists of a capsule, which is adherent to the epidermis, and is made up of innumerable filaments and spores. The hair loses its colour and drops out. The hair-bulbs are generally destroyed, and therefore hollow spots are left. The scratching often leads to eczema. *Treatment*.—Remove the crusts by oil, and destroy parasites by sulphur ointment or sulphur lotion, The free inunction of cod-liver oil is also useful.

*Tinea tonsurans* (ringworm) or herpes tonsdens is caused by a fungus (*Trychophyton tonsurans*). Is a vegetable parasite affecting the roots of hairs close to the scalp, and is popularly known as ringworm. It is very contagious, and epidemic in children. It consists of circular, scurfy patches, from a two-anna-piece to a rupee-piece in size, having a slightly raised and scurfy surface, and the hairs over it are dry, lustreless, and brittle, and broken off close to the scalp. The *conidia* attack the hairs. Generally there is abundant formation of adherent scurf, which clings round the hair-follicles. The disease occurs in hairy parts, *T. tonsurans*, or may affect the non-hairy parts, *T. circinata*, or attacks whiskers and moustachios, *T. sycosis*. It is attended with itching. Filthy locality, as the groins and armpits, are often its most frequent seat. It is inveterate, and may last for years. *T. circinata* occurs in patches and is red, scaly, itchy, and circular in form. *Herpes tendens*.—When the patches present concentric rings, separated by a healthy skin, and the margin of each patch is red, and covered with vesicles or pustules. The disease is most common in India. Heat, perspiration, and uncleanness, promote its development. *Seat*.—Folds of the thighs, armpits, and groins. Is a disease of the debilitated, dyspeptic, and the intemperate. *Treatment*. — Cooling lotions, fomentations or soothing ap-

*Tinea  
tonsurans.*

plications are useful at first, followed by weak astringents, and subsequently by mercurial inunctions and sulphur applications; internally, tonics, cod liver oil, &c., are useful. Very often after a time the fungus burrows deep into the follicles, and therefore in recent cases the cure is more rapid than in old and chronic ones. Two or three applications of iodine in recent cases may almost cure. In many cases free blistering of the part, and when the blister has healed sulphur in any of its forms may be a useful application; cod-liver oil may be given internally. Crysophanic acid may be used. I have found an excellent remedy in the juice or tincture of Gujkurun. Occasionally tinea tonsurans leaves the scalp bare and shining, simulating alopecia areata.

*Tinea kerion.*

*Tinea kerion*.—Is a variety of *T. tonsurans* in which the hair follicles are much inflamed, and the patch looks prominent and discharges an albuminous fluid. The patch is swollen and perforated with holes. *Treatment*.—Alleviate pain, and try parasiticide.

*Tinea versicolor.*

*Tinea versicolor*, or *chloasma*, or *pityriasis versicolor* is a parasitic disease common in adults. It occurs in fawn-coloured patches, which are slightly raised, rough, itchy, and scaly at edges. *Seat*.—Chest, abdomen, and parts covered by flannel. The parasite originates in filth and in those who wash little or rarely change their linen; it also occurs in weak persons who suffer from phthisis. *Treatment*.—Keep the parts clean by soap and water; flesh brush or towel may be used for scrubbing, and use parasiticide.

*Urticaria.*

*Urticaria* or *nettle-rash* is a serous infiltration of the papillæ of the skin. In it the erythematous rash appears and disappears suddenly, and has the development of wheals. In adults the wheals are well marked, and leave no trace behind when they disappear. In them urticaria may be acute or chronic, and is apt to recur. *Causes*.—External: irritation of stings of insects and plants. Internal: diet,

as decomposing animal and vegetable matter, bad fish or fruit; drugs, as copaiba, turpentine, &c.; fevers, worms, and menstrual disturbances. It is often symptomatic of nervous exhaustion. There is fever, vomiting, and prostration. The skin itches dreadfully, and then appears the wheal eruption which is often white. It may be discrete or coalesced. In some cases the face swells enormously. It is not followed by desquamation. *Treatment*.—Remove the cause. An emetic or purgative will do good. Soda bicarbonate is useful as a wash. In children, wheals are not so distinct and are followed by development of fleshy papules. Chronic urticaria is unattended with any fever. To relieve itching some recommend lotion of benzoic acid and water.

*Vitiligoidea*.—Is a buff-coloured patch at the inner canthus of the eye, in those who have suffered from jaundice. *Vitiligoidea*.

*Warts*.—They are small hypertrophied developments of the cuticle. Often removed by nitric acid, caustic potash, or by nitrate of silver. *Warts*.

*Xanthelasmaidea* occurs in children as flat yellow patches, or as small raised tubercles. The tubercular variety is attended with tenderness and itching. It occurs on any part of the skin; it also affects the mucous membrane as the nose, gums, tongue, &c. Is associated with jaundice. *Treatment*.—Attend to the hepatic derangements. *Xanthelasmaidea*.

*Xeroderma* is a variety of ichthyosis found in adults in the course of chronic wasting diseases. The disease is incurable; keep the skin soft by glycerine and oil (refer to *Ichthyosis*). *Xeroderma*.

Further information will be gathered from the special descriptions of the several diseases referred to in works on dermatology.



# INDIAN BAZA

NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahr.
Abelmoschus esculentus	Malvaceæ	Throughout India	Bhéndi Ramturai	Bhéndi	Dhéras ramtorai	Bhénda
Abrus precatorius. Country liquorice	Leguminosæ	Common throughout India	Gunj ka jahad	Mulathi Hindi	Jaishtom dhu kunch ka jahar	—
Acacia Arabica. Babul bark	„	Throughout India	Babulka chalikar ka chal	Kaliskikar ki chilka	Babul chal	Bavalac chala
Acacia Catechu	„	„	Kath	Kathah	Khut	Katha
Achyranthes aspera	Amarantaceæ	„	Lal-chirchiri	Agareh ka jur	—	Upang
Aconitum heterophyllum	Ranunculaceæ	Indore, Decan gujerat Mountains	Atees	Atvika	—	Ataviceæ
Aconitum napellus	„	Himalayas	Bishnak	Katbish	—	Mitha j
Acorus Calamus. Sweet flag root	Acoraceæ	Malabar, Ceylon, Nepaul	Bach vach	Vach	Safed bach	Vekhan
Ægle Marmelos. Bae fruit	Auranticeæ	Throughout India	Leaves are called <i>tripatra</i> , decoction of fruit. <i>Bel-sootic</i>	Bael shripthal	Bael phal	Belacha
Agathotes Chirayta (Opheelia)	Gentianaceæ	Himalayas and throughout India	Cheriata	Cheriata	Chirota	Chiraeta
Aleurites Tri-loba	Euphorbiaceæ	Lower Bengal	—	—	—	—

# DRUGS.

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Buzratti.					
Budo	Dried fruit, fresh fruit	Mucilage, decoction, inhalation of decoction, poultices of leaves	Emollient and demulcent	Fevers, gonorrhœa, irritable throat	Ad libitum.
Gathi jimumdh	Fresh or dried root	Extract, syrup	Demulcent	Coughs in children	3ss—j of fresh syrup.
Bulni chal	Bark and gum	Decoction, injection, enema, gargle	Astringent	Internally, chronic diarrhœa; injection in leucorrhœa; enema in piles and prolapsus ani; gargle in sore throat and spongy gums	3iss—ij of decoction; gr. x—xv powder.
Kio	Root and leaves	Extract, infusion	Astringent and tonic	Internally, diarrhœa; locally, ulcerations of gums with foetid discharge, toothache; as a wash in sore nipples	3ss—j; gr. xv powder.
Uc nujahar	Root, seeds, flowering tops, ashes of burnt plant	Powder	Astringent, diuretic	Bowel complaints, for bites of venomous animals, dropsy	3j—3ij decoction.
Atce	Root, powder	Infusion	Bitter tonic, Aphrodisiac, febrifuge	Fever, ague, debility after fever	gr. xxx; gr. v—x; powder; 3j infusion.
Binack Ahooh jeher	Root	Liniment, ointment, tincture, extract, alkaloid	Acrid narcotic	Locally, liniment, for criminal purposes, neuralgia, rheumatic pains	
Verach	Root	Decoction	Tonic, stomachic, stimulant	Intermittent fevers, dyspepsia, flatulence, dysentery, cough	3j.
phal	Fruit	Decoction, juice of the leaves, and ripe fruit, fluid extract	Antibilious, febrifuge, refrigerant, astringent	Habitual costiveness, chronic dysentery, chronic diarrhœa	3ss extract; 3iss decoction.
Katoo	Dried plant	Tincture, infusion	Bitter tonic, febrifuge	Debility, fever, loss of appetite, indigestion	3ss tincture; 3iss infusion.
le akh.	Kernels	Oil	Aphrodisiac, aperient	Purgative	3j of oil.

NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahr.
Aloe Indica	Liliaceæ	Throughout India	Musabbar Ilva	Musanbar	Moshabbar	Musambola
Alumen Sulph.	—	All bazaars	Phitkari	Phitkiri	Phitkiri	Turati
Anacardium Occidentale	Terebinthaceæ	—	Hinglee badam	Hinglee badam	Kajoo badam	—
Andropogon Muricatum	Graminaceæ	Bengal, Coromandel Coast	Khus khus	—	—	—
Anthemis nobilis	Compositæ	Persia, Indian bazaars	Baboona phool	Bhaboon	—	Bhaboon cha ke
Anthemis Pyrethrum	„	Indian bazaars	Akurkora	—	—	—
Arachis hypogæa	Leguminosæ	—	Chinee badam	—	—	—
Areca Catechu	Palmaceæ	Bengal, Indian palms	Soopari	—	—	Soopari
Narthex Assafoetida	Umbelliferæ	North India, Bengal, Indian bazaars	Hing	Hing	Hing ungoozeh	Hing
Asteracantha longifolia	Acanthaceæ	Bengal and India	Talma khane Goksura	Kolsi	Kantakolika	Ikshug
Astragalus Virus	Leguminosæ	Himalayas	Kotilla	Kotilla	—	—
Azadirachta indica (Nim Margosa)	Meliaceæ	Bengal	Nimb	Nim	Nim	Limbac hada

Guzratti.	Parts used.	Preparations.	Properties.	Uses.	Doses.
Liyo koom-ar	Inspissated juice	Extract, decoction, tincture	Purgative	Disordered menstruation, hysteria, flatulence, sick headache, habitual constipation	gr. ij—ijj.
Atkee	Crystals	Powder, lotion, injection, poultice	Acid astringent	Poultice in ophthalmia, sore eyes. Locally in ulcers (aphthæ), prolapsus, leech bites. Internally in hæmorrhages of internal organs, chronic diarrhœa, diabetes, whooping-cough. Injection in gonorrhœa and leucorrhœa	gr. x — xx extract; ʒj decoction; ʒi tincture.
Baglee ba-m	Kernal. Pericarp contain oil called cardole	Oil, gum	Emollient, demulcent, like olive oil	Same as olive oil.	
Bus khus	Seeds	Infusion	Gentle stimulant	Fevers.	
Laboon na-mool	Leaves and flowers	Infusion, poultices	Stomachic, anti-spasmodic, tonic	Dyspepsia, general debility	ʒj—iss in fusion.
Uul guro	Root	Root	Masticatory	Toothache, obstinate salivation.	
Cnee budam	Seeds	Oil	Like olive oil, emollient and aperient	Like olive oil.	
Spari	Nut	Slices	Masticatory	To promote digestion.	
Eg	Gum resin	Tincture, resin, (devil's dung)	Carminative, stimulant, tonic, anti-spasmodic, expectorant	Hysteria, fainting, nervous disorders, flatulent, colic, obstinate coughs	gr. v — x extract; ʒss — j tincture.
Tim khana	Leaves, roots	Decoction	Diuretic, tonic	Gravel, dropsical affections.	
Eilo	Gum tragacanth	Powder	Demulcent	Gonorrhœa	gr. xx — xxx.
Lranu ja-l	Leaves, bark, oil from pericarp	Poultices of leaves, decoction, oil, liniment, powder	Bitter, astringent (substitute for cinchona); tonic	Poultices of leaves. Foul ulcers and buboes. Internally, bark, in fevers, rheumatism, loss of appetite. Liniment of oil for rheumatic pain	Decoction. ʒj—iss powder ʒj.



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mal.
Balsamoden- dron gummi- phora	Terebintha- cæ	Bengal	Googul	—	—	—
Balsamoden- dron Myrrha	„	East Indies	Hirabol	Hirabol	—	—
Chavica Betel. Betel leaves	Piperacæ	Throughout India	Pan tumbol	Pan	—	Madva pana, cha p
Cæsalpinia	Leguminosæ	Bengal, Bom- bay	Katkalija kat karanj	Gajgá	Nátukoranjá	Gajaga
Bonduc	—	Throughout India, Per- sian lakes	Shoaga Tinkal	Sohaga	Sohaga	Tinka
Guilandina						
Borax						
Berberis	Berberacæ	Himalayas	Chitra kush- mul, Rusot (extract)	—	—	—
Lycium						
Butea frondosa	Leguminosæ	Mountainous districts of India	Palas ka binj (seeds), pa- laski goond (exudation)	Kingshooka binj, palas goond	Pelaspáprá	Phalus binj p cha g
Calotropis gi- gantæa	Asclepiacæ	Throughout India	Ak-akond Mu- dar	Akra, akund	Akondo	Akdach hada
Camphora offi- cinalis	Lauracæ	Nepaul	Kafúr	Kaphur	Kapur	Kapoor
Cannabis In- dica	Cannabinacæ	Nepaul, Bhurt pore, Mirzapore, and Jeypore	Bhang	Bhang	Gunjah	Bhang

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Guzratti.					
ogul	Gum resin	Gum	Alterative, expectorant	Coughs	gr. j—ij.
erabol	„ from bark	„	Bitter, acrid, aromatic, like myrrh	Emmenagogue, locally to foul ulcers, gargle in sore mouth	gr. ij—v; emmenagogue.
aduvna pan, pona na pan	Leaves	Leaves	Masticatory, poultice, stimulant	Poultice to chest in cough, dyspnoea and liver diseases, to breasts to arrest milk	Ad libitum.
igá kuvro ulgo	Leaves, kernels	Powder	Tonic, febrifuge, bitter	In fevers, in debility after fevers.	gr. xv—5ss.
nkunkhar	Crystals	„	Astringent	Locally, in aphthæ, thrush, and affections of mouth, in sore nipples; internally, in tedious labours	3j—ij.
osot	Stems, roots, and branches	Extract	Tonic, febrifuge	Fevers, impaired digestion. Locally, round the eye, in ophthalmia	3ss.
asapapro, nakur no bondur	Seeds, exudation from bark and stems	Gum resembling kino (Bengal)	Astringent, vermifuge (seeds)	Chronic diarrhoea and dyspepsia, in round worms	Extract gr. ij—iij; seeds gr. xx.
lanu jahad	Bark and root	Powder, juice	Alterative, nauseant, as ipecacuanha	Leprosy (white), syphilis, skin diseases, dysentery	Powder gr. iij; gr. xxx in dysentery, one dose only.
poúr	Crystals	Aquæ Camph., liniments, powder	Alterative and diaphoretic, sedative, stimulant, masticatory	Liniment in chronic rheumatism, lumbago, and painful parts; internally in coughs in children; in asthma, gonorrhoea, and spermatorrhoea, in painful uterus, or generative organs; a local application in bedsores	gr. ij—v.
lung churus njo	Resinous juice (churus), dried hemp plant, with leaves (ganjah), larger leaves and capsules without stalks (subjee, bhang, or sidhee) confection is called mazoom	Tincture, extract	Narcotic, intoxicating, anodyne, antispasmodic, aphrodisiac	Produces catalepsy, used in tetanus, hydrophobia, and neuralgic affections; useful in disordered menstruation	xxx—3ss tincture; gr. ½, extract.

NAMES.						
English and Botanical	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Maar.
<i>Capsicum annum</i>	Solanaceæ	Throughout India	Lal mirch, Gach-merich	Lal mirchi	Lal morich	Mirsenga
<i>Carum nigrum</i>	Umbelliferæ	„	Shajeera	Shajeera	—	Shajeera
<i>Carum album</i>			Jeera	Jeera		Jeera
<i>Caryophyllus aromaticus</i> (cloves)	Myrtaceæ	Moluccas	Lóng	Lóng	Lavang	Lavanga
<i>Cassia alata</i>	Leguminosæ	India, Bengal	Dadmurdan, Dadka pat	Dadh mari	Dadka puttah	Dadh pu
<i>Cassia elongata</i> (senna)	„	India, Tinnevely	Sonaka pat	Shonpat	Nat ki sana	—
<i>Cassia Fistula</i>	„	Bengal and many parts of India	Sondal	Amultas	Pykassie	—
Charcoal(wood)	—	—	Lakrika koye-lah	Lakri ka kolsa	Kashtha koy-ila	Lakdacha-lase
<i>Cinnamomum zeylanicum</i>	Lauraceæ	Malabar, Sumatra, Ceylon, and Java	Tauz, dalchee-nee	Dalchini	Dalchini	Dalachini
<i>Cissampelos hexandra</i> (substitute for <i>Pareira brava</i> ), gravel root	Menispermaceæ	Bengal	Neemooka	—	Neemooka	—
<i>Cocculus cordifolius</i>	„	„	Gulbel gulancha, Satee gilo (extract from stem)	Gulbel, gulbel ka sat (extract)	Gulancha, palo (extract), Pachana (decoction of stems, roots, and leaves)	Gulavelé, gulavele tract)
<i>Cocculus indicus</i> ( <i>Anamirta paniculata</i> )	„	Malabar	Kakmari ke binj	Kakmari ke binj	Kaka mari	—

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Guzratti.					
Murchoo	Oil called cap- sicin, seeds, bruised fruit	Poultice, powder, tincture, gargle	Stimulant, rubefa- cient, condiment	Poultice with mustard. Internally, in scarla- tina, sore throat, dys- pepsia, loss of appetite, diarrhoea; gargle, in relaxed sore throat and hoarse voice	gr. v—x. 3ss tinc- ture.
Jeeroo	Seeds	Seeds	Local irritant, car- minative, condi- ment	Locally in ringworm; internally in dyspep- sia, diarrhoea, flatu- lence	gr. v—xxx.
roo	"	"			
lung	Leaves	Powder, tinc- ture, infusion, oil	Bitter, pungent, spicy, aromatic, stimulant, carmi- native, condiment, masticatory	Indigestion, colic, fla- tulence, convales- cence from fever; lo- cally, to caried tooth (oil).	Tincture 3ss; infusion 3j—3ij.
eyti Aghati adhur no uló	"	Leaves, bruised and rubbed	Rubefacient	Ringworm and skin diseases.	
ona mukhi	"	Infusion, tinc- ture	Aperient	Constipation of bowels	Infusion 3j—3ij; tincture 3j—3ij.
rmáro	Pulp of pods	Electuary	Purgative	Base for purgative electuaries.	3iv—3j.
kdano kolso	Powder	Powder, poultice	Deodorizer, as tooth-powder	Poultices on foul ulcers, internally for foul gases from sto- mach	gr. v—xv.
z Dalchee- ee	Bark	Oil, powder, tinc- ture	Aromatic, stoma- chic, astringent, carminative, cor- dial	Diarrhoea, [dyspepsia, flatulence	Tincture 3ss; oil, 1 drop; pow- der gr. x— 3ss.
—	Roots and stems	Infusion, liquid, extract	Diuretic, tonic, aperient	Kidney diseases, blad- der affections	3ss extract; 3j—3ss in- fusion.
lvel no palo, lvel	Roots	Infusion, decoc- tion, extract, and tincture	Substitute for sar- saparilla, diuretic, tonic, febrifuge	Gonorrhoea, fevers, de- bility, enlarged spleen, dyspepsia	3ij infusion, gr. x ex- tract.
kmari na inj	Fruit, seeds	Ointment	Insecticide	Used to destroy ver- min, pediculi, or lice	



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahratt.
<i>Cocculus palmatus</i> (columbo)	Menispermaceæ	Madras, Mozambique, Bombay, Ceylon	Columbo ke jur	Kalumba cha katri	—	Kalumb
<i>Cocos nucifera</i>	Palmaceæ	Throughout India	Narcole	—	—	Naliere cole
<i>Convolvulus scammonia</i>	Convolvulaceæ	Guzerat	Sukmoonyia	Sukmonyia	—	—
<i>Coptis teeta</i>	Ranunculaceæ	Assam Mismese	Meshmeeteeta	Mesmie teeta	—	—
<i>Coriandrum sativum</i>	Umbelliferæ	Throughout India	Dhanyia	Kushneez	Dhana	Dhania
<i>Crocus sativus</i>	Iridaceæ	Persia, Cashmere	Jaffran	Keysar	—	Jaffran
<i>Cupri sulphas</i> (blue-stone)	—	Indian markets	Nila Tuta	Mortutta	Mhor tutah	Tutyia
<i>Croton Tiglium</i>	Euphorbiaceæ	Hindoostan, Ceylon	Jypal jamalgota	Jamal gottah	Jamal gota	Nepalac
<i>Cucumis colocynthis</i>	Cucurbitaceæ	Upper India	Indrayen	Bishumba	Makhal	Indrayen
<i>Curcuma longa</i> (turmeric)	Zingiberaceæ	Throughout India	Haldi	Hulud	Holodi	Haledee

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Amuzratti.					
Amala kalumb	Root	Powder, tincture, extract, infusion	Tonic, stomachic, bitter	Convalescence from fever or from acute diseases	Powder gr. x—3ss; tincture 3ss; infusion 3j.
Amber	Fruit, shell, water, oil, milk	Oil, as cod-liver oil, milk	Water in shell as cooling drink, shell for preparing Indian hooka; fruit nutritious, emollient; oil for ointments, as olive oil, refrigerant	In tubercular diseases, for gastric irritation.	
Amomy	Juice concrete	Gum, powder	Drastic purgative	Is contraindicated in inflammatory and irritative bowels; in dropsy it is useful	gr. i—iiij extract or powder.
—	Root	Root, infusion, powder, tincture, extract	Bitter tonic, substitute for calumba	After fevers	Powder gr. x; infusion 3j; extract gr. ii.
Amma	Seeds, fruits	Condiment, masticatory, oil	Aromatic, stimulant, carminative	Dyspepsia.	
Amear Jaff-	Dried stigma of flowers	Condiment	Exhilarant, antispasmodic, narcotic, emmenagogue	Luxury.	
Amchuth	Crystals	Powder, lotion	Astringent, tonic, emetic	Internally in chronic diarrhoea, chronic dysentery; diarrhoea of phthisis; locally in diphtheria and ulcers; as emetic in poisoning by opium, nuxvomica, dhatura, arsenic, aconite, &c.	gr. $\frac{1}{4}$ —i; emetic, gr. v—x.
Amil goto	Oil from seeds	Oil, liniment	Purgative	Apoplexy, acute diseases, convulsions; locally, liniment in chronic rheumatism and chest diseases	One drop.
—	Seeds and pulp	Resinous matter, oil, powder	Cathartic	In constipation	gr. xxx of powder.
Amid	Root, stalk	Root, stock	Application, stimulant, carminative	Flatulence, catarrh, cold in the head, in bruises, locally	gr. v—xx.

NAMES.						
English and Botanical.	Order.	Locality.	Hindustan.	Dukhni.	Bengali.	Mah.
Cydonia vulgaris	Pomaceæ	Cabul, India Market	Beheedana	Beheedana	—	—
Cubeba officinalis (Piper cubebea)	Piperaceæ	Java	Kabab chini	Dumke mirchie, Kabab-chini	Hunsee mirchie	Soogund Miree
Datura fastuosa. Datura alba	Solanaceæ	Throughout India	Kala Dhatura Sufed Dhatura	Dhatura	Dhatura	—
Dill seeds. Anethum sowa	Umbelliferæ	„	Soyashova	Soya	Sulpha shonva shova	—
Diptero-carpus, lævis (Wood oil)	Dipterocarpaceæ	Assam, India Bazaar	Gurjan ka tel	Gorjon tel	Gorjon tel	—
Elettaria cardamomum	Zingiberaceæ	Malabar, Travancore, Kakdi	Chota ilachee	Elaechee	—	Elchee
Emblica officinalis	Euphorbiaceæ	Bengal, Decan, Malabar	Ambla	Anola	—	—
Ferri sulph.	—	India	Hera kasis	Heera kasish	Hirakos birakosis	—
Galls. Quercus infectoria	Cupuliferæ	Armenia, Asia Minor	Mazóphal	Maíphal	Majuphál	Maiph shika
Garcinia mangostana	Guttiferæ	Singapore	Mangosteen	—	—	—

	Parts used.	Preparations.	Properties.	Uses.	Doses.
uzratti.					
ana	Seeds	Seeds	Demulcent, emollient, tonic, restorative	Coughs and fevers.	
ubehini, dā miree	"	Oil, powder, tincture, extract	Stimulant, urinary organs	Gonorrhœa, gleet, leucorrhœa, coughs of old people	Powder ʒss; tincture ʒss; oil m ij.
Dhaturo, ed dhu-	Seeds, leaves, fresh juice	Seeds, tincture, liniment, leaves as fumes, poultice and fomentation	Intoxicative, narcotic, emollient. Smoke of leaves anodyne, antispasmodic	Is a substitute for belladonna. Internally, in rheumatism, lumbago, asthma, headache, epilepsy, disorders of menstruation. Poultice on wounds in tetanus, and guinea worms.	Tincture mxx—s.
oca	Seeds, substitute for English (dill)	Infusion	Carminative	Abdominal pain, flatulence, and colic	ʒj.
uan nu tel	Oil	Balsam, gurgan tel (wood oil)	Diuretic, stimulant to genito-urinary organs	Gonorrhœa, substitute for copiaba, and superior, used in leucorrhœa, gleet, leprosy	mx—ʒss.
laee	Seeds	Seeds, tincture	Condiment, masticatory, cordial, stimulant, aromatic	Dyspepsia, gastric irritation, and water-brash, adjuncts to bitters, stimulants, and purgatives.	ʒss.
m	"	" and bark	Cooling drink astringent	In bilious affections. Drinks in fevers, in diarrhœa.	
ir ussee	Crystals	Powder	Tonic, astringent	Anæmia, in fever with enlarged spleen, neuralgia, dropsy, piles, whooping-cough, chronic diarrhœa, and chronic dysentery.	gr. ¼—ii.
ayhal na	Juice concrete	Juice, ointment, injection, decoction, gargle, wash	Astringent in piles	Ointment in piles, prolapsus ani; injections in gleet, gonorrhœa, relaxed sore-throat; internally in fevers, poisoning by opium, and nux vomica, in dysentery.	gr. iij—vij; ʒj decoction.
an stin	Fruit, bark	Fruit, bark, rind of fruit	Astringent, tonic	Chronic dysentery.	



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahratt.
<i>Garcinia pictoria</i> (Hebradendron)	Guttiferæ	Mysore	Gamboge	Ossara Rewund	—	Revund khatai
<i>Gentiana</i> (Kurroo)	Gentianaceæ	Himalayas, Simla, Mussooree	Kurroo	—	—	—
<i>Glycyrrhiza glabra</i> (Liquorice)	Leguminosæ	Indian bazaar, Liquorice	Jeshto modhu	—	—	Jestim
Ginger. <i>Zingiber officinale</i>	Gingiberaceæ	East and West Indies	Soonth Sindhi	Soont	Soonth	Soonth
<i>Gynocardia odorata</i> , Chalmogra	Flacourtiaceæ	Calcutta, Bengal	Chalmogra ka binj	Chalmogra	—	Chalmogra cha, I.
<i>Helleborus niger</i>	Ranunculaceæ	N al	Kalakootkee	—	—	—
<i>Hemidesmus Indicus</i> (country Sarsaparilla)	Asclepiadeæ	Throughout India	Junglee, Chandbelli	Nannire jar	Anunto mul	—
<i>Hermodactylus</i>	Liliaceæ	Indian bazaars, Cashmere, Arabia	Soorinjan	—	—	—
<i>Hydrocotyle Asiatica</i> .	Umbelliferæ	Bengal and India	Vallari	Vallari	Thalkuri	Thalkuri
<i>Hirudo medicinalis</i>	Asnnelida	Throughout India. In abundance in Poona, Delhi	Jonk	Jonk	—	Julvat

	Parts used.	Preparations.	Properties.	Uses.	Doses.
azratti.					
anchedee no se	Juice	Juice, concrete	Purgative, substitute for English gamboge	As a purge.	gr. i—ii.
—	Root	Root, substitute for gentian, tincture, extract, infusion	Bitter tonic	After fever, dyspepsia, loss of appetite	3ss tincture. gr. v extract; 3j infusion.
et mudh	Root, underground stem	Lozenges, powder, extract	Demulcent and Pectoral	In coughs.	gr. v extract.
ooh Adruk, dc (Fresh)	Dried root	Infusion, tincture, powder	Stimulant, acrid, aromatic, carminative	In colic, flatulence, bowel complaint, cold catarrh, fevers, toothache, face-ache, and headache; in hoarseness of voice a piece is chewed.	3ss tincture; gr. x powder; 3j infusion.
haogro- nu	Seeds, oil	Seeds (kernels), oil	Alterative, emollient	Leprosy, skin diseases, chronic rheumatism, syphilitic eruptions	gr. vi seeds; oil drops, 3 to 6.
kal kootkee	Root	Powder, locally poultice, plaster	Cathartic, uncertain	Dropsy (uncertain).	
ale gamthi	„	Root, infusion	Substitute for Sarsaparilla, alterative, diaphoretic, tonic and diuretic	Superior to Sarsaparilla in syphilis, cachexia, chronic rheumatism, loss of appetite	3j infusion.
oorn]	„	Tincture	Substitute for colchicum, diuretic, sedative	Chronic rheumatism, gout, torpid liver and dropsy	3ss.
—	Leaves	Powdered leaves	Stimulant application, bitter alterative	Locally, chronic ulcers; internally in leprosy, scrofula, syphilis, bowel complaints in children	gr. iij—vj.
ully	—	—	Blood suckers	Fevers, with severe and constant headache, severe and acute chest and abdominal diseases, severe headache, acute dysentery, whooping-cough.	

NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahr.
Hydrargyri chloridum cum bichloridum	—	Indian bazaar	Ruskuppoor	—	—	—
Hydrargyri persulphuretum	—	„	Hingool	Hingul	Shunaf	—
Hyoscyamus niger	Solanaceæ	Sherunpore, Agra, Ajmere	Khoræsanee ajwain	—	—	—
Ipomœa turpethum	Convolvulaceæ	Bengal, Ceylon, India	Teoræe	Doodh kulmee	Doodh kulmee, Toorbood	—
Iris Florentina	Iridaceæ	Indian bazaar	Bug Bunofsha	—	Begbunofsha	—
Kaladana (Pharbitis nil)	Convolvulaceæ	Indian bazaars	Kaladanah	Kalizirki ka binj	Kaladana Nilkolomi	—
Kamala malilotus Philippiensis	Euphorbiaceæ	Trævancore, Mysore, Bombay	Kamella	Kamela	Kamela	—
Kokum butter (Garcinia purpurea)	Guttiferæ	—	Kokum katel	—	—	—
Lawsonia alba (Henna shrub)	Salicariæ	—	Mhendee	Mhendi	Mhendi	Mendh
Luffa echinata	Cucurbitaceæ	Bengal and India	Bindaal	Kali tori	Kurwa tori	—
Lemon grass oil (Andropogon citratus)	Graminæ	Throughout India, Ceylon	Akya ghaska aitr Gundbel	Hazarmasalehka utter	Agyia ghans-tel	—
Lime	—	—	Chunah, Karee matee	Chunnah	Chunah	Chunah

uzratti.	Parts used.	Preparations.	Properties.	Uses.	Doses.
apoor	Powder	Powder	Alterative, fumi- gatory	In syphilis, leprosy.	
lo	,,	,,	Fumigatory, alter- ative	Syphilis.	
asanee un	Leaves, seeds	Seeds, cata- plasms, extract	Narcotic, sedative, anodyne	Pain and irritation from sores, substitute for hyoscyamus	gr. iij—iv.
—	Bark, root	Powder	Purgative	Constipation	Ḑj—5ss.
unofsha	Root	Root	Substitute for orris root, purgative emetic	In tooth power. In constipation	Ḑj.
alana	Seeds	Powder, extract, tincture	Purgative (safe)	Substitute for jalap	5ss powder.
ylo (Ka- ce)	Capsule	Powder	Anthelmintic	Tapeworms.	
n nutel	Concrete cakes	Oil, ointments	Replaces animal fat for ointments	Dressings.	
ed	Leaves	Leaves, poultice	Application (Ma- homedan), natives colour their nails and teeth	Burning of the feet.	
—	Whole plant	—	Bitter tonic, febrile, alterative	Dropsy, specific for en- largement of spleen.	
iya nu- el	Oil	Oil	Stimulant	Internally in flatu- lence, colic, obsti- nate vomiting; lo- cally in neuralgic pains, chronic rheu- matism.	
noo	Powder	Powder, lime- water, liniment wash	Alkaline effects	Acidity of stomach, heartburn, indiges- tion, diarrhoea from acidity, obstinate vomiting, poisoning by acids. Injection in irritability of genitals. Wash in syphilitic ulcers. Liniment in burns and scalds.	



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahr.
The lime, Citrus Bergamia	Aurantiaceæ	Throughout India	Ninbu, Lima	Limu Nibu	Nebu	Limbu
Mentha sativa	Labiatae	Bengal, Bombay	Phoodina	Phoodna	—	—
Manna (official), Fraxinus Ornus	Oleaceæ	Indian bazaars	Shir khist	—	—	—
Maranta arundinacea	Marantaceæ	Bengal, Burdwan	—	—	—	—
Mesua ferrea	Guttiferae	Malabar, Java	Nag kashore	Nagkassur	—	—
Michelia Champaca	Magnoliaceæ	Bengal	Champae	Champa	—	—
Mellifica apis, honey	Secretion from apis mellifica (bee)	Throughout India	Shahad mudh	Shahad	Modhu	Madah
Moringa pterygosperma	Moringaceæ	All over India	Sujeenah	Sengva	Mungeka jahar	Jahada ngach
Musa sapientum, the plantain tree	Musaceæ	—	Kelahka per	Mouzka jahar	Kela gach	Kelach
Mustard, Sinapis ramosa, Sinapis juncea	Cruciferae	All over India	Rai-Rayen	Rai, Kali Surson	Rai	Mohar
Terminalia Chebula, Myrobalana chebula	Combretaceæ	India, Cabul	Harra Pilehar	Halda halra	Haritaki Hora	Hirado

Part used.	Preparations.	Properties.	Uses.	Doses.
u, nimbu	Juice, rind	Fresh juice, peel used for tincture, syrup, infusion	Antiscorbutic, cooling drinks, locally relieves irritation of bites	Scurvy, in fevers, poisoning by croton oil, swelling of mosquito bites.
o	Leaves	Leaves	Substitute for mints	In dyspepsia, vomiting.
	Concrete exudation	Exudation	Mild laxative in children or delicate females	In constipation grv—grxx.
root	Fecula, from roots	Fecula	Light food for sick and invalids	In fevers, inflammatory affections grxx—5i.
gasur	Flowers	Powder, oil	As an astringent	In hæmorrhoidal discharges, oil for itch.
apoo	Bark	Bark extract	Bitter aromatic; substitute for guaiacum	Chronic rheumatism, fevers gr. x—5ss.
d	Secretion	Oxymel, boracis	Stimulant	Coughs, application called <i>caromel</i> for indolent ulcers.
ta, Singh	Root resembles horseradish	Powder	Rubefacient, stimulant, diuretic	Paralysis, hysteria, epilepsy, chronic rheumatism, hoarseness and relaxed sore throat.
laho jahad	Leaves	Leaves	Dressing for blistered surfaces, shade for eyes	Substitute for gutta-percha for dressings in ophthalmia
iyeds, ara-Tel (il)	Seeds, oil	Powder, poultice	Resembles English mustard; revulsive	In drunkenness, narcotic and other poisoning, overloaded stomach, internally as an emetic. In apoplexy, delirium, convulsions, headache, chest affections, as poultices.
hulud, arl	Powder	Powder	Cathartic	Cathartic gr. ij.

## NAMES.

English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahr.
<i>Myristica officinalis</i> , mace, nutmeg	Myristicaceæ	Sumatra, Moluccas	Jayphul, jaepatree	Jaephul, jaepatree	Jaephal, jaepatree	Jaephal
<i>Nardostachys jatamansi</i> (spikenard)	Valerianaceæ	North India	Jatamansi balchar	Jahtamansi	Jatamansi	Jatama
<i>Nicotiana Tabacum</i>	Solanaceæ	India, Sindh	Tumbakoo	Tumak (powder)	—	—
<i>Nigella sativa</i>	Ranunculaceæ	India	Kalajira	Kalajira	Mugrela	—
<i>Orchis mascula</i>	Orchideæ	Cashmere	Salep misree	—	—	—
<i>Oryza sativa</i>	Graminaceæ	All over India	Chaval	Chauval	Chal Chauval	Tandul
<i>Papaver somniferum</i>	Papaveraceæ	Throughout India, Patna, Benares, Malwa	Juice, Afeem capsule, Posto Deheree	Afeem	Afeen	Affoo
<i>Pedaliu Murex</i> (smell like musk)	Pedaliacæ	Throughout India	Bara Ghokru	Burra gokhro	Bura gokhro	Hatterrette
Papawtree, <i>Carica Papaya</i>	Papayaceæ	India	Popaiyah	Papai	Papaiya	Papay
<i>Pinus longifolia</i>	Coniferæ	Himalayas, Jamna River	Gundabiroza	Surul	—	—
<i>Piper longum</i>	Piperaceæ	Throughout India	Pipoolmul	Pippali	—	—

	Parts used.	Preparations.	Properties.	Uses.	Doses.
l, ja- ee	Fruit and petals	Powder, oil	Aromatic, stimulant, carminative, substitute for cloves and cinnamon, narcotic, embrocation, masticatory, condiment	Oil used to allay pain and for indolent ulcers; in chronic rheumatism.	
-	Root	Root, tincture	Substitute for valerian, nervine stimulant, antispasmodic	Hysteria, epilepsy, and nervous disorders, chorea, flatulence, adjunct to tonics	5ss—ij ; gr. v—x.
khoo, ir ve- ere	Leaves. Powder (snuff)	Leaves, powder	Smoking, chewing, sedative, expectorant	Asthma, headache.	
isree	Seeds	Seeds	Tonic, condiment	Increase the secretion of milk.	
	Tubers	Powder	Nutritive, demulcent, aphrodisiac	For invalids and scrofulous children.	
	Seeds freed from husks	Decoction, seeds, powder, poultice	Nutritive	Decoction called <i>conjee</i> is used in diarrhœa, fevers, diseases of lungs and bowels. Powder dusted over sores quickly heal burns and scalds; erysipelas. As poultice in abscesses, boils, buboes, and in chest affections.	
n juice) us usno (c sules)	Juice, capsules	Poppy heads, opium, extract, tincture, decoction	Hypnotic, narcotic, anodyne, stimulant	Internally in gallstone, diarrhœa, pains of bladder or uterus; locally in bruises and pains, paregoric for children; internally for pains of rheumatism, cancer, carbuncle, colic, to relieve spasms and strictures, dysentery, chest affections, &c.	Extract gr. j; tincture mx.
ro- cto	Capsules unripe, leaves and whole plant	Mucilage, infusion	Diuretic, demulcent	Allays irritation of bronchial and urinary mucous membranes	3j; infusion gr. j.
aya	Juice	Juice	Anthelmintic	Round worms.	
-	Resin and oil	Oil	Similar to turpentine	The same as oil of turpentine.	
kin pee- repur al (ot)	Root sliced powdered catkins	Powder	Stimulant, aromatic, carminative	Catarrhal affections, local stimulant to painful parts.	



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mal.
Piper nigrum	Piperaceæ	Mulaccas, Java, Malabar Coast	Kali mirich, Sha morich, deprived of pericarp	Gol murich	Kala morich Sha morich	Mire
Physic nut, Curcas purgans, Jatropa	Euphorbiaceæ	—	Junglee arundi	Junglee Yarandi	Bhon - Bhe-randa	Rana
Pistacia Lentiscus (mastic)	Terebinthaceæ	Bengal	Roomie mustakee	Mustakee	—	
Plantago Ispaghula	Plantaginaceæ	Assam, India	Esupghool	Isphagal	Euspgul	Isaba
Plumbago zeylanica	Plumbaginaceæ	Throughout India	Lalchita rak	Lalchitur mul	Raktochita	Tam tra
Potassæ nitras	—	,,	Shorah	Soorah	Sora	Shor
Prunus Bokhariensis	Rosaceæ	Persia	Aloo Bakhara	—	—	
Psoralea corylifolia	Leguminosæ	All over India	Babchee	Bacchee	—	Ravi
Pterocarpus marsupium	,,	Travancore, Nilgherries	Kumur kus	Peetsal	—	
Ptychotis Ajwan, or Omum seeds	Umbelliferae	Throughout India	Ajvayan	Ajvain	Ajvan	Vov
Punica Granatum (pomegranate)	Granateæ	Throughout India	Anarkaper	Gulnar, anarka jahar	Dalim gach	Dali hac

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Cratti.					
la muree. ut muree leived of arp)	Powder	Powder	Pungent, stimulant, contains acrid matter, febrifuge, stomachic	Fevers, cholera, for piles in old persons, as gargle in relaxed sore throat.	
nee arun- ed	Leaves, oil, juice	Juice	Checks hæmorrhage from wounds, styptic	Poultice of leaves increase the secretion of milk; oil is similar to castor oil, but very powerful.	
one mus- ce	Resin	Exudation	Masticatory, mild stimulant	To fill up carious teeth.	
bulna e	Seeds	Seeds	Demulcent, emollient	In irritation of urinary organs, chronic diarrhœa and dysentery, inflammatory bowel complaints, gonorrhœa	3ss—j.
litra	Root	Root	Vesication, counter irritation	For criminal abortion.	
oo khar	Crystals	Powder	Diaphoretic	Fevers, headache, delirium, bleeding from respiratory passages, rheumatism.	Gr: xx— 3js.
oo	—	—	Cooling laxative, like prunes	Constipation.	
ve	Seeds	—	Stomachic, deobstruent; in leprosy	In white patches I have obtained very great success, but needs further confirmation	Gr. x— gr. xv.
m kus	Gum resin	Resin	Resembles kino of commerce, astringent	Chronic diarrhœa, and dysentery	Gr. v.
no mum anee	Dried, unexpanded flower buds, fruit	Seeds, fruit	Pungent, aromatic, stimulant, antispasmodic, carminative tonic	Cough, hoarseness of voice, relaxed sore throat and nausea or griping of other drugs, hysteria, diarrhœa, flatulence	gr. x—3ss.
dub ha	nu Rind, fruit, and root bark	Decoction, injection	Astringent	Internally, in diarrhœa, advanced stage of dysentery; root-bark for tapeworm; gargle in relaxed sore throat, and vaginal discharges	Decoction, 3j—3iss.

NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahratt.
<i>Quercus infectoria</i> (galls)	Cupuliferæ	Cabul, Bokhara, Mezenderan	Majuphal	Maiphul	Majuphal	Maiphul, Mashi
<i>Ricinus communis</i>	Euphorbiaceæ	Throughout India	Arandika tel	Yarandika tel	Bheranda tal	Erund.
<i>Sal ammoniac</i>	—	Indian bazaars	Nousadur	Nousagar	Noshagur	Nova g.
<i>Santalum album</i> (sandlewood)	Santalaceæ	Throughout India	Chunden, Sandul ka atur	Sandoon, Chandan ka atir	Sandel ka tel	
<i>Sagus lævis</i> (sago)	Palmaceæ	Sumatra, Moluccas	Sago	Raurbyra	—	
<i>Scilla indica</i> (squills)	Liliaceæ	Sea coasts	Junglee peeaz	Koondree	Junglee piag	
<i>Semecarpus Anacardium</i>	Terebinthaceæ	Mountainous parts of India	Bhelatuk	Bhela	—	Bhelat.
<i>Sessamum orientale</i>	Pedaliaceæ	Throughout India	Teelaka tel, mitha tel	Mitta tel	Goor tel	Chokh.
<i>Smilax China</i>	Smilaceæ	Eastern countries, Calcutta market	Chob cheence	—	—	
<i>Strychnos nuxvomica</i>	Loganiaceæ	Ceylon, Coromandel coast, Bengal jungles	Kuchela	Koochla	Papeeta	

	Parts used.	Preparations.	Properties.	Uses.	Doses.
Guzratti					
Madaphal	Concrete, juice like gall-nuts	Infusion, powder, astringent, wash, gargle	Astringent, substitute for gallic or tannic acid	In chronic discharges from rectum or vagina; antidote against opium, nuxvomica, &c., in chronic diarrhoea, dysentery, in gleet, relaxed sore-throat	gr. v — x powder. 3j infusion.
Andinoo tel	Seeds	Oil by expression leaves	Oil, aperient, gentle and quick	Leaves increase the secretion of milk; used as poultices.	3iv—3j oil.
Ny sagur	Crystals	Lotion	Alterative, cooling sedative	Poultices to prevent milk abscesses; to prevent boils from suppurating. Internally, in neuralgias, as tic, face-ache, chronic rheumatism, coughs in old people; chronic chest or liver diseases; locally for bruises, muscular pains of the chest, hysteria, &c.	gr. x—xx.
Schud nu	Wood, oil	Oil	Sedative, cooling in irritation of urinary organs	In gonorrhoea, gleet	Oil, mxxx—3j; powder 3j.
Soo chokha	Cellular tissue extracted and dried	Decoction	Cooling, used as rice	All purposes as rice.	
Bateekando	Bulbous roots	Tincture, acetum, oxymel, powder	Expectorant, substitute for English squills	In coughs as official squills	mxx—3ss, tincture; gr. i—ii power.
Ba moo	Acrid juice	Juice	Locally, counter-irritation	To remove rheumatic pains, aches, sprains.	
Who tel	Seeds	Seeds	Demulcent, emollient, substitute for almond oil	Dressings for ulcers, suppurating wounds.	
Chai ghas	Roots, sliced	Decoction	Demulcent, nutritive, as a substitute for sarsaparilla	For same purposes as sarsaparilla.	
Jer kuchu	Bark, seeds, alkaloid	Seeds, tincture, powder	Intense bitter, tonic, and laxative. In Calcutta they call it kohun, or false Angustura bark	In fevers; acts on spinal motor nerves. Given in paralysis of the intestines	gr. $\frac{1}{30}$ of alkaloid seed $\frac{1}{4}$ to $\frac{1}{2}$ .



NAMES.						
English and Botanical.	Order.	Locality.	Hindustani.	Dukhni.	Bengali.	Mahratt.
Styrax Benzoin	Styracineæ	Sumatra, Java	Loobun	Looban	—	—
Sulphur	—	Nepaul, Java, Persia	Amulsa, gunduk	Gunduk	Gunduk	Gundakal
Tamarindus indica	Leguminosæ	East and West Indies	Amlee, Tentool	Amblee	Amlikabot, Tintiree	Chinch
Telni Mylabris cichorei	Caleopterae (Insect)	Hydrabad Deccan	Telni makhi	Badboki zirangi, Telni	Zirangi	Meloe
Turpentine Oil, Pinussylvestris	Coniferae	Indian bazaar	Gundba bero- jakatel	Gundba ber- oozekatel	Kafurkatel	Kupura tel
Tylophora asthma- tica (country Ipecacua- anha)	Asclepiadeæ	Bengal, India	Untamul	Junglee pik- wan	Pitkari	Antomul
Vernonia (conyza) anthelmintica	Synanthereæ	Waste lands, India	Somraj buk chi	Somraj	—	Ranacha ji
Valeriana hardwickii	Valerianaceæ	Hills of Almo- rah	Tuggur	Shumeo	—	—
Vateria indica	Diptero- carpaceæ	East Indies, Mysore	Suffed dam- mar	Kundro	Suffed dam- mar	—
Wrightia anti- dysenterica	Apocynaceæ	Ghauts Concun	Khoorchee	Indrajav	—	—

	Parts used.	Preparations.	Properties.	Uses.	Doses.
uzratti.					
n	Resinous balsam	Resin	Source for benzoic acid, expectorant, stimulant	Coughs, chronic chest diseases.	
lsa rio dhuk	Powder	Ointment	Insecticide, mild laxative	Cutaneous diseases, laxative for children, in piles	gr. iii—viii powder.
ee	Pulp of fruit	—	Laxative, refrigerant for sherbet. In large doses laxative, promotes action of sweet purgatives, as manna, cassia, but retards the action of resinous purgatives.	In febrile and inflammatory affections, in scurvy, in simple costiveness.	
laukhi	Oil	Oil	Actions and uses same as Spanish fly	Same cases as for Spanish fly.	
ur nu tel etun	Oil	Oil	Locally, stupes or epithems; counter irritants, enemata, liniments, ointments	Internally in inflammations, bowel complaints, flatulence. Liniments in chest affections, insensibility, convulsions	3j decoction.
u, mul	Root, leaves	Powder, root, infusion, wine	Substitute for ipecacuanha, emetic	In dysentery, diarrhoea, chronic bronchitis, early stage of whooping-cough	3ss, emetic; gr. v—viij.
do jiri	Powder	Seeds,	Vermifuge	Round worms, seeds destroy lice	3ij.
g r	Root	Root, tincture, infusion	Substitute for valerian; stimulant, antispasmodic	Nervous disorders	3ss tincture
ifa na	Resin	Resin	Substitute for resin in ointments	Dressing for carbuncles and ulcers.	
de jaw	Bark (Connessi bark) decoction	Bark, seeds, decoction	Bitter tonic, febrifuge	Dysentery and other bowel complaints (hæmorrhagic kind), vermifuge (seeds).	

## PRESCRIPTIONS OF INDIAN DRUGS.

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### ALTERATIVES AND RESOLVENTS.

#### 1. MŪDÁR (root-bark of *Calotropis procera*) :

1. ℞ Mūdár powder, gr. ix; Liquorice powder, gr. ix. Mix. Divide into three powders. One to be given three times a day.

As an alterative tonic in syphilis, dysentery, skin diseases, and cachexia, and as an expectorant in bronchitis. The dose may be gradually increased to ten grains.

2. ℞ Mūdár powder, ʒss—j; Syrup., ʒij; Aquæ, ʒiss. Mix. Make a draught. As an emetic.

A very good substitute for Ipecacuanha; hence called “country Ipecacuanha.”

#### 2. CHÁLMOGRÁ (seeds and oil of *Gynocordia odorata*) :

3. ℞ Powder of Chálmográ seeds, gr. xv; Mucilage of gum acacia, quantity sufficient. Mix and divide into three pills; one to be taken thrice a day, gradually increasing the dose to gr. xv.

Supposed to act as a specific in leprosy. Useful in scrofula and skin diseases.

4. ℞ Chálmográ oil, ℥xv; Mucilage of gum acacia, ʒij; Aquæ, ʒiij. Mix well in a mortar. One third part to be given thrice a day. The dose of the oil may be gradually increased to twenty or thirty minims. Use as above.

#### 3. GÁOZABÁN (leaves, &c., of *Onosma bracteatum*) :

5. ℞ Gáo zabán, ʒiss; Boiling water, Oj. Macerate for one hour in a covered vessel and strain. Two to four ounces of the infusion to be given three times a day.

Alterative, tonic, diuretic. In hypochondriasis and chronic nervous diseases, diseases of the kidney, palpitation, rheumatic pains, and venereal affections.

6. ℞ Gáo zabán or Gûle Gáo zabán (flowers), ʒj; Bádranjboyá (the plant of *Melissa umbrosa*), ʒss; Boiling water, Oj. Prepare infusion. Two to three ounces to be given three times a day, sweetened with a little sugar or syrup. Use as above.

4. JADVÁRA (the root of *Delphinium pauciflorum*) :

7.  $\mathcal{R}$  Jadvára, powdered,  $\mathfrak{z}\text{ss}$ ; Gáoabán,  $\mathfrak{z}\text{ss}$ ; Boiling water,  $\mathfrak{z}\text{vj}$ .  
Prepare infusion. One third part to be given three times a day.

In paralysis and nervous diseases, jaundice and disease of the liver, and low fevers.

8.  $\mathcal{R}$  Jadvára, powdered, gr. lx; Country spirit,  $\mathfrak{z}\text{ij}$ ; Aquæ,  $\mathfrak{z}\text{j}$ . Rub the powder with spirit and add the water, and make a draught.  
Supposed antidote in snake and animal poisoning.

5. ANANTÁMŪL (the root of *Hemidesmus indicus*) :

9.  $\mathcal{R}$  Anautámúl, bruised,  $\mathfrak{z}\text{j}$ ; Boiling water,  $\mathfrak{z}\text{x}$ . Infuse in a covered vessel for one hour and strain. Two to three fluid ounces to be given three times a day.

In skin diseases, secondary syphilis, and scrofula. Is a very good substitute for Sarsaparilla; hence called "country Sarsaparilla."

10.  $\mathcal{R}$  Anautámúl, bruised,  $\mathfrak{z}\text{v}$ ; Liquorice root, bruised,  $\mathfrak{z}\text{iv}$ ; Máزاریúm (Bazar, name of Mezereon), bruised, gr. xv; Boiling water,  $\mathfrak{z}\text{xx}$ . Digest for an hour, then boil for fifteen minutes in a covered vessel; cool and strain. From two to three ounces to be given three times a day.

In secondary syphilitic affections, and in chronic rheumatism and skin diseases.

6. CHITRÁ-CHÁL (the bark of *Plumbago rosea*) :

11.  $\mathcal{R}$  Chitrá-chál, gr. x; Hardá, pericarp only of (fruit of *Terminalis bellerica*), gr. xx; Piper (long-pepper), gr. xxx. Reduce these to a fine powder, and mix well. Dose, gr. x to gr. xx, three times a day.

In dyspepsia, chronic rheumatism, and secondary syphilis.

12.  $\mathcal{R}$  Chitrá-chál, powdered, gr. vi; Khūrā sánee ajwán (the seeds of *Hyoscyamus niger*), powdered, gr. x; Mucilage, q. s. Mix. Make a pill mass. Divide into eight pills. One to be given two or three times a day.

In chronic rheumatism and secondary syphilis. It also relieves pain of joints.

7. SHÁHTERÁ (the herb of *Fumaria parviflora*) :

13.  $\mathcal{R}$  Sháhterá,  $\mathfrak{z}\text{iss}$ ; Anisúm (the fruit of *Pimpinella anisum*),  $\mathfrak{z}\text{ij}$ ; Bádián (Fennel seeds),  $\mathfrak{z}\text{ij}$ ; Aquæ,  $\mathfrak{z}\text{xvj}$ . Digest for half an hour, then boil down to six ounces; cool and strain. One third part to be given three times a day.

In cachexia, skin diseases, and in chronic diseases of the liver and spleen.

14.  $\mathcal{R}$  Sháterá,  $\mathfrak{z}\text{iv}$ ; Hardá (pericarp of, fruit of, *Terminalis bellerica*),  $\mathfrak{z}\text{v}$ ; Kásnee (seeds of *Cichorium intybus*),  $\mathfrak{z}\text{ij}$ ; Unáb (fruit of *Zizyphus vulgaris*), No. 20; Sipastán (fruit of *Cordia myxa*), No. 20; Aftímún (the plant of *Cuscuta reflexa*),  $\mathfrak{z}\text{v}$ ; Banaf shá (the plant of *Viola odorata*),  $\mathfrak{z}\text{ij}$ . Infuse with twenty ounces of boiling water for fifteen minutes, then boil for ten minutes;



cool and strain. Three to four ounces of the decoction to be taken twice or thrice a day.

As an alterative to purify the blood in skin diseases, cachexia, old cases of fever, chronic enlargement of the liver, and ague cake.

8. **SURANJÁU** (the corm of *Hermodactylus*), a substitute for colechicum :

15.  $\mathfrak{R}$  Súranján, powdered,  $\mathfrak{z}$ ij; Sacchari, powdered,  $\mathfrak{z}$ ij. Mix well. One drachm of this powder to be given three times a day; the dose may be gradually increased to two or three drachms.

In chronic gout and rheumatism.

16.  $\mathfrak{R}$  Súranján,  $\mathfrak{z}$ v; Sanámaki (*Senna* leaves),  $\mathfrak{z}$ iiij; Hardá, pericarp of (fruit of *Terminalis bellerica*),  $\mathfrak{z}$ iss; Sacchari,  $\mathfrak{z}$ x. Reduce the ingredients to a fine powder, and mix well. From two to three drachms two or three times a day.

In chronic gout and rheumatism.

9. **HARDÉ** or **HAR** (fruit of *Terminalis citrina* or *myrobalans*) :

17.  $\mathfrak{R}$  Hardé, the pericarp of,  $\mathfrak{z}$ j; Himaj (black *Myrobalans*),  $\mathfrak{z}$ ij; Hardán behedán, pericarp of (*Terminalis bellerica* or *Belleric myrobalans*),  $\mathfrak{z}$ ij. Reduce the ingredients to a fine powder and mix. One to two drachms of the powder to be given twice a day with syrup or honey.

In dyspepsia, loss of appetite, impaired tone of the digestive system, nervous headache, and general debility.

10. **NAOSÁDAR** (*Sal. ammoniac*) :

18.  $\mathfrak{R}$  Naosádar, gr. xv to xxx; Infusion of Anantá mul,  $\mathfrak{z}$ iv. Mix. One third part three times a day.

In tic douloureux, headaches, chronic rheumatism, jaundice and chronic affections of the liver, and guinea-worm.

11. **RÁSNÁ** (root of *Aristolochia longa* ?) :

19.  $\mathfrak{R}$  Rásná,  $\mathfrak{z}$ iv; Gûgal (*Indian Bedellium*),  $\mathfrak{z}$ v; Clarified honey, q. s. Mix well into a uniform mass. Dose,  $\mathfrak{z}$ ss to  $\mathfrak{z}$ j.

In chronic rheumatism, sciatica, and neuralgic pains.

20.  $\mathfrak{R}$  Rásná,  $\mathfrak{z}$ j; Gûlvela (stem of *Cocculus cordifolius*),  $\mathfrak{z}$ ij; Devadára (wood of *Pinus deodera*),  $\mathfrak{z}$ ij; Súntha (*ginger*),  $\mathfrak{z}$ j; Erand-mûla (root of *Ricinus communis*),  $\mathfrak{z}$ j; Boiling water,  $\mathfrak{z}$ x. Boil for ten minutes in a covered vessel and strain. Dose, half to be taken twice a day.

In chronic rheumatism and neuralgic pains.

## ANTISPASMODICS.

12. **HINGA** (*Assafoetida*) :

21.  $\mathfrak{R}$  Hinga, gr. ix; Hirá-bole (bazár *Myrrh*), gr. xviii; Gande-birajá (bazár *Galbanum*), gr. ix. Mix. Divide into nine pills. One pill to be given every three or four hours.

In hysteria, colic, flatulence, and spasmodic diseases.

22.  $\mathbb{R}$  Hinga,  $\mathfrak{zss}$ ; Sûntha (ginger),  $\mathfrak{zj}$ ; Pipar (long pepper),  $\mathfrak{zj}$ ; Ajwán (fruit of *Ptychotus ajwan*),  $\mathfrak{ziss}$ ; Bádián (fruit of *Illicium anisatum*),  $\mathfrak{zj}$ . Reduce the ingredients to a fine powder and mix well. Dose, from gr. x to gr. xx, mixed up with a little honey.

In flatulence, colick pains, and spasmodic diseases.

13. FÛDINÁ (the plant of *Mentha vulgaris*) :

23.  $\mathbb{R}$  Fûdina urke (spear-mint water). Used as a stomachic and carminative for children in flatulent colic. Dose,  $\mathfrak{zj}$  to  $\mathfrak{zij}$ , for adults.
24.  $\mathbb{R}$  Fûdina (dried),  $\mathfrak{zij}$ ; Ajwán or Ova (fruit of *Ptychotus ajwan*),  $\mathfrak{zij}$ ; Elchee-dáná (Cardamom seeds),  $\mathfrak{zj}$ ; Kálá-miri (black pepper),  $\mathfrak{zj}$ ; Sadáb (dried *Ruta angustifolia*),  $\mathfrak{zj}$ ; Sûntha (ginger),  $\mathfrak{zj}$ . Reduce the ingredients to a fine powder, and mix with sufficient clarified *shed* (honey), so as to form a confection. One to two drachms of the confection to be given to an adult every three or four hours.

In flatulence, flatulent colic, nausea, and irritability of the stomach after indigestion; in hiccough and spasms.

14. SADÁB or SITÁB (the dried herb of *Ruta angustifolia*) :

25.  $\mathbb{R}$  Sadáb, gr. xxx; Tankan-khár (biborate of soda), gr. xxx; Sûntha (ginger),  $\mathfrak{zj}$ ; Kálá-miri (black pepper),  $\mathfrak{zj}$ . Rub the ingredients to a fine powder. Dose, from gr. xv to gr. xx.

In flatulence, colicky pains, hiccough, hysteria, and convulsions from irritation of intestinal worms.

15. JATÁMÁNSI or KÁLI-CHUD (the root of *Nardostachys jatámansi*) :

26.  $\mathbb{R}$  Jatámánsi,  $\mathfrak{zij}$  to  $\mathfrak{ziv}$ ; Boiling water,  $\mathfrak{z}x$ . Boil for fifteen minutes in a covered vessel; cool and strain. From two to three ounces three or four times a day.

In hysteria, and nervous and spasmodic affections, where Valerian root is indicated.

27.  $\mathbb{R}$  Jatámansi,  $\mathfrak{zj}$ ; Mastakî (gum resin of *Pistacea lentiscus*),  $\mathfrak{zss}$ ; Gárikûn (fungus of *Agaricus ignarius*),  $\mathfrak{ziss}$ ; Eliá (aloes), gr. xx. Reduce to a fine powder and mix. Dose, gr. xv to gr. xxx.

In epilepsy, hysteria, and convulsions.

16. JÛNDI BIDASTAR (*Castoreum*) :

28.  $\mathbb{R}$  Jûndi-bedastar, gr. vi to xli; Pipar (long pepper), powdered, gr. vi; Ginger, powdered, gr. iii. Mix with mucilage. Divide into six pills. One to be given every three or four hours.

In hysteria, flatulent colic, and spasmodic affections.

29.  $\mathbb{R}$  Jûndi-bidastar,  $\mathfrak{zj}$ ; Darûnaj-î-akrabî (root of *Daronium scor-poides*),  $\mathfrak{zj}$ ; Jatámánsi (root of *Nardostachys jatámansi*),  $\mathfrak{zj}$ ; Shed (honey), quantity sufficient. Reduce the ingredients to a fine powder, and add sufficient honey to form a confection. Dose,  $\mathfrak{zss}$  to  $\mathfrak{zj}$ . Use same as form 28.

## 17. AFSANTIN and JUND :

30.  $\mathcal{R}$  Afsantin (flowering plant of *Artemisia doonens*), 3j; Anisûn (fruit of *Pimpinella anisum*), 3ij; Karfas (fruit of *Opium graveoleus*), 3ij; Gárikûn (fungus of *Agaricus igniarius*), 3ij; Jûnd (*Castoreum*), 3ss. Reduce the ingredients to a fine powder and mix well. Dose, 3ss to 3j.

In flatulence, colic, hiccough, and intussusception of the bowels when opium is frequently combined with it.

31.  $\mathcal{R}$  Kirdamáná (seed of *Conium maculatum*), 3j; Kirmánî-ova (flowers of *Artemisia cabulica*), 3ij; Gájar-bija (seed of *Daucus carota*), 3ij; Jûnd (*Castoreum*), 3j; Asárûn or tagar (root of *Asarum Europæum*? or *Valerian*?), 3j; Shed (honey), 3iv or q. s. Reduce the ingredients to a fine powder, and mix with sufficient honey to form a confection. Dose, 3ss to 3j.

In flatulence, colic, and spasmodic affections.

18. SÛMBÛL-UL-TIB (root of *Nardostachys jatamansi*) : *Arab.*

32.  $\mathcal{R}$  Sûmbûl, 3j; Anisûn (fruit of *Pimpinella anisum*), 3j; Kálá miri (black pepper), 3j. Reduce these to a fine powder. Dose, 3ss to 3j. Mixed with a little honey or syrup.

In colic, hysteria, epilepsy, and spasmodic diseases.

33.  $\mathcal{R}$  Sûmbûl, 3j; Afsantin (flowering plant of *Artemisia doonence*), 3v; Gûlab-kali (dried buds of *Rosa centifolia*), 3iss; Sonf (fennel), 3iiss; Boiling water, lbs. 3. Infuse for one hour, then boil gently for half an hour; strain, add 1 lb. of sugar, and dissolve by gentle heat. Dose, from 3ij to 3vj.

In biliary colic and spasmodic diseases.

19. AJWAN (fruit of *Ptychotus ajwan*) :

34.  $\mathcal{R}$  Ajwán, 3j; Ajmûd (fruit of *Opium involucreatum*), 3j; Sonf (fennel), 3j; Rânitalsî (dried leaves of *Ocimum canum*), 3ss; Jayapatri (arillus of *Myrostica officinalis*), 3ss. Reduce these to a fine powder and mix. Dose, 3ss to 3j, with an equal quantity of sugar.

In flatulence and colic.

35.  $\mathcal{R}$  Ajwán-ká-phûl (stearopten obtained from the seeds of *Ptychotis ajwan*). Dose, from gr. i to gr. ii.

In flatulence, colic, and spasmodic affections.

20. SÎHÁ ZIRÁH (fruit of *Carum nigrum*) :

36.  $\mathcal{R}$  Sîhá ziráh, 3v; Kálá-miri (black pepper), 3iss; Sûntha (ginger), 3ij; Sadâb (dried rue), 3ij; Tankan khàra (biborate of soda), 3ss; Shed (clarified honey), 3iij. Reduce the ingredients to a fine powder and mix with sufficient honey, and prepare confection in the usual way. Dose, 3j to 3iij.

In flatulence, hiccough, tympanitis, colic, and spasms of the bowels.

37.  $\mathcal{R}$  Sûvá, bruised, 3ss to 3j; Boiling water, Oss. Infuse in a covered vessel for half an hour and strain. Dose, 3j to 3ij for adults.

In flatulence and colic. It is supposed to promote the secretion of milk.

A weaker infusion (3j to 3ss) may be used for children in abdominal pains, flatulence and colic.

38.  $\mathcal{R}$  Sâvâ-kâ-ark (distilled water of Sâvâ, or Indian drill seeds). To be prepared and used as dill water, for which it is a very good substitute.

21. ANISUM (fruit of *Pimpinella anisum*) :

39.  $\mathcal{R}$  Anisum (fruit of *Pimpinella anisum*), 3j; Kârfas (fruit of *Apium graveolens*), 3j; Mastaki (gum resin of *Pistacia lenticus*), 3j; Zâfrân or Kesar (saffron), 3j; Fatar Sâlyân (fruit of *Prangos fabularia*), 3ss; Asârûn (root of *Valeriana citica* ?), 3ss; Fûdinâ (plant of *Mentha vulgaris*), dried, 3ss. Reduce the ingredients to a fine powder, and add sufficient juice of Sadâb (rue) to form a pill mass, and prepare a five-grain pill. Dose, 5 to 10 pills.

In flatulence, tympanitis, hiccough, and in convulsive and spasmodic diseases.

22. KASTÛRI (musk) :

40.  $\mathcal{R}$  Kastûri, 3ss; Sûntha (ginger), 3j; Kâlâ-miri (black pepper), 3j. Reduce the ingredients to a powder, and make a five-grain pill. Dose, 2 to 4 pills.

In spasmodic and convulsive affections.

ASTRINGENTS.

23. MÁJÛPHAL or MÁYÁ (galls) :

41.  $\mathcal{R}$  Májûphal (gall from *Quercus infectoria*), finely powdered, 3j; Sugar, powdered, 3j. Mix well. Dose, from gr. xx to gr. xl, three times a day.

In chronic diarrhœa, advanced stages of dysentery, and in passive hæmorrhages.

42.  $\mathcal{R}$  Májûphal, bruised, 3ij; Boiling water, 3v. Boil for ten minutes in a closed vessel, then strain, and add as much water as to measure five ounces. Dose, from one to two fluid ounces.

In diarrhœa and dysentery. Also in poisoning by *Datura*, *Nux vomica*, *Bish*, and *Narcotics*.

The decoction is useful as a gargle in sore throat and sponginess of and hæmorrhage from the gums, as an injection in leucorrhœa, and as a wash in prolapsus of the rectum.

43.  $\mathcal{R}$  Májûphal, 3iss; Dâlimba-sâla (pericarp of pomegranate), 3iij. Rub the ingredients to a fine powder. Dose, from 3ss to 3ij.

In chronic dysentery and dysenteric diarrhœa.

24. BELÁ or BAEL (unripe fruit and pulp of the fruit of *Ægle marmalos*) :

44.  $\mathcal{R}$  Belá (dried), 3ij; Boiling water, 3viii. Infuse it in a covered vessel for half an hour and strain. Dose, from 3ij to 3iij, three times a day.

In atonic diarrhœa and chronic dysentery.



45.  $\mathcal{R}$  Belá, dried, Válá (root of *Andropogon muricatus*); Motha (root of *Cyprus rotundus*); Dhaniá (coriander), Súntha (ginger), of each  $\mathfrak{z}\text{ij}$ . Prepare six ounces of decoction in the usual way. Dose,  $\mathfrak{z}\text{ij}$  to be given three or four times a day.

In chronic dysentery.

46.  $\mathcal{R}$  Belá,  $\mathfrak{z}\text{iss}$ ; Sonfa (fennel),  $\mathfrak{z}\text{j}$ ; Súntha (ginger),  $\mathfrak{z}\text{ss}$ ; Sugar,  $\mathfrak{z}\text{j}$ . Rub these to a fine powder and mix. Dose, from  $\mathfrak{z}\text{ss}$  to  $\mathfrak{z}\text{j}$ , two or three times a day.

In mild cases of acute dysentery and in chronic dysentery.

47.  $\mathcal{R}$  Belá,  $\mathfrak{z}\text{ij}$ ; Motha (root of *Cyprus rotundus*),  $\mathfrak{z}\text{j}$ ; Ginger,  $\mathfrak{z}\text{ss}$ ; Mochras (gum-resin of *Bombax malabaricum*),  $\mathfrak{z}\text{j}$ . Reduce the ingredients to a fine powder. Dose, from  $\mathfrak{z}\text{ss}$  to  $\mathfrak{z}\text{j}$ , mixed up with a little sugar and water.

48.  $\mathcal{R}$  Belá,  $\mathfrak{z}\text{iv}$ ; Gaja-pimpali (the plant of *Plantago anaplexicaulis*),  $\mathfrak{z}\text{j}$ ; Válá (root of *Andropogon muricatus*),  $\mathfrak{z}\text{j}$ ; Lodhra (bark of *Symplocos racemosa*),  $\mathfrak{z}\text{j}$ . Rub these to a fine powder. Dose, from gr. xx to gr. xxx.

In chronic diarrhœa and dysentery.

49.  $\mathcal{R}$  Belá, dried pulp of,  $\mathfrak{z}\text{iiss}$ ; Súntha,  $\mathfrak{z}\text{ss}$ ; Soufa (fennel),  $\mathfrak{z}\text{ij}$ ; Sugar,  $\mathfrak{z}\text{ij}$ . Rub the ingredients to a fine powder. Dose,  $\mathfrak{z}\text{ss}$  three times a day on the first day;  $\mathfrak{z}\text{j}$  on the second, gradually increased to  $\mathfrak{z}\text{ij}$ .

In chronic dysentery and dysenteric diarrhœa of hot climates.

## 25. ISPHAGÛLA or ISBAGÛL (seeds of *Plantago isphaghula*) :

50.  $\mathcal{R}$  Isphagûla seeds,  $\mathfrak{z}\text{ij}$ ; Cold water, Oss. Infuse for ten or fifteen minutes, shaking occasionally till a thin gummy liquid is formed, and strain. Dose of the infusion, from  $\mathfrak{z}\text{ij}$  to  $\mathfrak{z}\text{iv}$ .

In dysentery and dysenteric diarrhœa.

51.  $\mathcal{R}$  Isphagûla seeds,  $\mathfrak{z}\text{iss}$  to  $\mathfrak{z}\text{j}$ ; Sugar, powdered,  $\mathfrak{z}\text{j}$ . Mix with the hand, and give every three or four hours.

In dysentery and chronic diarrhœa. The seeds may be slightly heated to increase their astringent properties.

## 26. CHÁHAR-TÛKHM or the four seeds :

52.  $\mathcal{R}$  Isphagûla, Tûkhmi-rehán (seeds of *Ocymum pilosum*), Tûkhmi-maró, Tûkhmi bártanga (seeds of *Plantago psyllium*), each  $\mathfrak{z}\text{j}$ . Mix the seeds with the hand. Dose,  $\mathfrak{z}\text{j}$  to  $\mathfrak{z}\text{ij}$ , with a little sugar, two or three times a day.

In dysentery and chronic diarrhœa. The seeds may be slightly heated to increase their astringency.

## 27. HIMAJ and HARDE (the myrobolaus) :

53.  $\mathcal{R}$  Himaj (unripe fruit of *Terminalia chebula*), fried in *ghee*, or castor oil, and powdered,  $\mathfrak{z}\text{iss}$ ; Sugar,  $\mathfrak{z}\text{j}$ . Rub them together. Dose,  $\mathfrak{z}\text{ss}$  to  $\mathfrak{z}\text{j}$ .

In mild cases of dysentery, especially when the stools are scanty and consist almost of mucus and blood.

54. R Himaj, ʒiss; Sonfa (fennel), ʒj; Sântlia (ginger), gr. xv. The *Himaj* should be fried in *ghee*, or castor oil, and the sonfa should be slightly heated; then they should be rubbed well to a fine powder. Dose, from ʒss to ʒj.

In mild cases of acute and chronic dysentery.

55. R Harda (the ripe fruit of *Terminalia cheobula*), ʒij; Behedá (the fruit of *Terminalia bellerica*), ʒij; Amlá (fruit of *Phyllanthus emblica*), ʒj. The pericarp of the fruits to be bruised and boiled in the usual way with a sufficient quantity of water to prepare six ounces of decoction. Dose, ʒij to ʒiij of the decoction three times a day.

28. MANGOSTIN (kind of fruit of *Garcinia mangostina*) :

56. R Mangostin, ʒj; Dhaniá (coriander), ʒij; Sonfa (fennel), ʒj. Bruise the ingredients, and prepare ten ounces of decoction in the usual way. Dose, ʒij to ʒij three times a day.

In chronic diarrhoea and dysentery.

29. MOCHRAS (gum-resin of *Bombay malaricum*) :

57. R Mochras, ʒj; Belá (dried pulp of *Ægle marmelos*); Ambá bathá (dried kernel of mango), ʒj. Powder and mix. Dose, ʒss to ʒij.

In dysentery and dysenteric diarrhoea. It is frequently combined with opium.

30. HABÛL-ÁS (fruit of *Myrtus communis*) :

58. R Habûl-ás, bruised, ʒij; Distilled water, ʒxij; Sugar, ʒvj. Macerate the bruised seeds in water for three hours; then boil for half an hour; strain, add sufficient water to make six ounces, then add the sugar, and dissolve it by gentle heat. Dose of the syrup, ʒss to ʒj.

In diarrhoea and dysentery.

59. R Habûl-ás, ʒij; Khas-khas (seeds of *Papaver somniferum*), ʒij; Bábul-gonda (gum from *Acacia Arabica*), ʒj; Kharnub (legume of *Seratonia siliqua*), ʒij. Reduce the ingredients to a fine powder. Dose, ʒj to ʒiss.

In diarrhoea and chronic dysentery.

31. TABÁSHIR (siliceous substance from the joints of *Bambusa arundinacea*) :

60. R Tabáshir, ʒj; Gúláb-kali (dried buds of *Rosa centifolia*), ʒj; Túkhmi-hamáz (seeds of *Rumex vesicatoria*), ʒiiss; Gúlnar (flowers of *Punica granatum*), ʒj; Bábul gonda (gum arabic), gr. l. Reduce the ingredients to a fine powder. Dose, ʒj to ʒij.

In diarrhoea and passive hæmorrhages.

61. R Tabáshir, ʒj; Gahûn-satva or Nisastá (fecula of *Triticum cestivum*), ʒj; Bábul-gond (gum arabic), ʒj; Majûphal (galls), ʒss; Hirá-dakhan (dragon's blood), ʒss. Reduce these to powder and mix. Dose, ʒss to ʒij.

In diarrhoea, hæmoptysis, menorrhagia, and passive hæmorrhages.

32. SŪMÁK (fruit of *Rhus coriaria*) :

62. R̥ Sūmák, ʒij; Gúlnár (dried flowers of *Punica granatum*), ʒij; Bábúl-gonda, ʒij. Reduce the ingredients to a fine powder. Dose, ʒj to ʒij.

In diarrhœa.

63. R̥ Sūmák, ʒij; Aquæ, Oj; Sugar, lb. j. Boil Sūmák in water for about one hour, strain, and dissolve the sugar by gentle heat. Dose, ʒss to ʒj, with cold water. Use as the preceding formula.

64. R̥ Sūmák, ʒij; Majúphal (galls), ʒj; Dálimb-sála (pomegranate bark), ʒss; Habúl-ás (fruit of *Myrtus communis*), ʒx. Reduce the ingredients to a fine powder and mix. Dose, ʒj to ʒiss.

In diarrhœa and hæmorrhages.

33. KŪDA-SÁLA or KUTAJA (bark of *Hollarhœna antidysenterica*) :

65. R̥ Kúdá-sála, ʒj; Vála (root of *Andropogon muricatus*), ʒj; Motha (root of *Cyprus rotundus*), ʒiss; Lodhra (bark of *Symplocas racemosa*), ʒj. Prepare six ounces of decoction in the usual way. Dose, ʒij three times a day.

In dysentery.

66. R̥ Kúdá-sála, ʒij; Belá (fruit of *Egle marmelos*), ʒij; Dálimb-sála (rind of pomegranate), dried, ʒj. Rub these to a fine powder. Dose, from gr. xx to gr. lx, three times a day, with a little honey or syrup.

34. DÁLIMBA-SÁLA (dried pericarp of *Punica granati*) :

67. R̥ Dálimba-sála, bruised, ʒij; Lavang (fruit of *Caryophyllus aromaticus*), ʒij; Boiling water, Oj. Prepare decoction in the usual way. Dose, from ʒij to ʒiij.

In diarrhœa and advanced stages of dysentery.

68. R̥ Dálimba-sála, ʒij; Taja (cinnamon), ʒss; Tamál-patra (leaves of *Cinnamomum tamala*), ʒss; Nága kosar (flowers of *Mesua ferrea*), ʒss; Dhaniá (coriander), ʒj; Sugar, ʒij. Reduce these to a fine powder and mix. Dose, gr. xx to xl.

In diarrhœa and chronic dysentery.

35. HIRÁ-DAKHAN (gum-resin of *Pterocarpus Draco* or dragon's blood) :

69. R̥ Hirá-dakhan (dragon's blood), ʒij; Gúlnár (dried flower of *Punica granatum*), ʒj; Bábúl gonda (gum arabic), ʒj; Afim (opium), gr. viii. Rub them together to a fine powder. Dose, from gr. xv to xxx, three times a day.

In hæmoptysis, hæmaturia, bleeding piles, passive hæmorrhages generally, and in diarrhœa.

70. R̥ Hirá-dakhan, ʒij; Fitakri (alum), ʒj; Gúlnár (dried flower of *Punica granatum*); Tukhmi khüfá (seeds of *Portuca oleracea*), ʒj. Rub these to a fine powder. Dose, gr. xx to gr. xl.

In chronic dysentery and hæmorrhage from the bladder, piles, lungs, and kidneys.

36. FITAKRI or FATAKRI (alum) :

71.  $\text{\text{R}}$  Fitakri,  $\text{\text{z}}$ ij; Taja (cinnamon),  $\text{\text{z}}$ ss; Sugar,  $\text{\text{z}}$ ij. Rub these to a fine powder. Dose, from gr. xx to gr. xl.

In acute diarrhœa and passive hæmorrhages.

72.  $\text{\text{R}}$  Fitakri,  $\text{\text{z}}$ ij; Gûlnâr (flowers of *Punica granatum*),  $\text{\text{z}}$ ij; Kharnûb (legume of *Ceratonia siliqua*),  $\text{\text{z}}$ j. Reduce these to a fine powder. Dose, from gr. xv to gr. xxx.

In diarrhœa, dysentery, and passive hæmorrhages generally.

37. ÂMLÁ (dried fruit of *Phyllanthus emblica*) :

73.  $\text{\text{R}}$  Âmlá, Mochrus (gum-resin of *Bombax malábaricum*), Harde (the ripe fruit of *Terminalis chebuli*), Tabáshir (silicious substance from the joints of *Bambusa arundinacea*), each  $\text{\text{z}}$ j. Reduce these to a fine powder. Dose,  $\text{\text{z}}$ ss to  $\text{\text{z}}$ j, two or three times a day.

In diarrhœa and chronic dysentery.

38. KÁKANAJ (fruit of *Puneceria coagulans*) :

74.  $\text{\text{R}}$  Kákanaj,  $\text{\text{z}}$ ij; Hirá-dakhan (dragon's blood),  $\text{\text{z}}$ ij; Bábul-gonda (gum arabic),  $\text{\text{z}}$ ij; Gile-armani (bole Armenia),  $\text{\text{z}}$ ij; Tûkhmi-khûrfá (seed of *Portulacea oleracea*),  $\text{\text{z}}$ ij. Reduce these to a fine powder. Dose, gr. xxx to gr. lx.

In passive hæmorrhages from the bladder and kidneys.

39. AKÁKIÁ (dried juice of the pods of *Acacia arabica*) :

75.  $\text{\text{R}}$  Akákiá,  $\text{\text{z}}$ ij; Habûlás (fruit of *Myrtus communis*),  $\text{\text{z}}$ ij. Reduce these to a fine powder. Dose, from gr. x to gr. xxx, three times a day.

In chronic diarrhœa, dysentery, and passive hæmorrhages.

40. KATHA or KÁTHÁ or KHAIRSÁL (catechu) :

76.  $\text{\text{R}}$  Káthá,  $\text{\text{z}}$ ij; Hirá-dakhan (dragon's blood),  $\text{\text{z}}$ j; Taja (cinnamon),  $\text{\text{z}}$ ss; Tamál-patra (leaves of *Cinnamomum tamalá*),  $\text{\text{z}}$ ss. Reduce these to a fine powder. Dose, gr. xv to gr. xxx.

In diarrhœa.

41. PATANGA (wood of *Cæsalpinia sappan*) :

77.  $\text{\text{R}}$  Patanga, bruised,  $\text{\text{z}}$ j; Taja (cinnamon), bruised,  $\text{\text{z}}$ ij; Water, Oj. Prepare decoction in the usual way. A very good substitute for logwood. Dose of the decoction,  $\text{\text{z}}$ j to  $\text{\text{z}}$ ij.

In diarrhœa, especially of children.

## CATHARTICS AND ANTHELMINTICS.

42. ELIA or SOKOTRI-ELIA (hardened juice of *Aloes socotrina*) :

78.  $\text{\text{R}}$  Sokotri-elía (socotrine aloes),  $\text{\text{z}}$ ij; Gûláb kali (dried buds of *Rosa centifolia*),  $\text{\text{z}}$ iss; Harde (ripe fruit of *Terminalis chebuli*), the pericarp only,  $\text{\text{z}}$ j; Mastaki (mastic),  $\text{\text{z}}$ j; Sakmûniá (scammony),



ṣss. Reduce the ingredients to a fine powder. Dose, gr. x to xx.

Useful as an aperient in bilious headache, facial neuralgia, and diseases of the eye.

79. *Ṛ* Eliá (aloes), ṣj; Har (the pericarp of the fruit of *Terminalis citrina*), ṣj; Hirá-bole (myrrha), ṣss; Gûl-kand (confection of rose), ṣij, or quantity sufficient to form a pill mass. Dose, from gr. v to gr. xx.

#### 43. HAR and HARDI (the myrobalans) :

80. *Ṛ* Har, the pericarp of (fruit of *Terminalis citrina*), ṣx; Alû (fruit of *Prunus Bokariensis*), No. 20; Sháthrá (leaves of *Origanum vulgare*), ṣvij; Shirkhisht (the manna from *Fraxinus rotundifolius*), ṣijj. Prepare six ounces of decoction in the usual way. Dose, from ṣijj to ṣvj.

In diseases of the head, eye, and intestines.

81. *Ṛ* Har, pericarp of (the fruit of *Terminalis citrina*), ṣijj; Himaj (unripe fruit of *Terminalis chebuli*), ṣiv; Káli-drákhsh (raisins), ṣv; Behdá (fruit of *Terminalis bellerica*), ṣijj. Prepare decoction in the usual way. Dose, from ṣijj to ṣvj.

A useful aperient in head affections, hepatic congestion, dyspepsia, and abdominal complaints.

#### 44. SANÁ MAKI (leaves of *Cassia lanceolata*) :

82. *Ṛ* Saná-maki, ṣij; Gûl-kand (confection of rose), ṣss; Shirkhisht (manna), ṣijj. Prepare at first four ounces of infusion of Saná-maki, and then add to it the other two ingredients and mix. Dose, from ṣijj to ṣiv.

A safe and efficient purgative for delicate persons and children.

83. *Ṛ* Saná-maki (senna), ṣj; Hardá, pericarp of (*Terminalis chebuli*), ṣj; Sûnthá (ginger), ṣss; Sugar, ṣss. Rub these to a fine powder. Dose, ṣss to ṣj.

A valuable aperient in constipation, &c.

#### 45. NISOTAR or TÁRBED (the root of *Ipomea turpethum*) :

84. *Ṛ* Nisotar, ṣj; Aftánûn (plant of *Cuscuta reflex*), ṣj; Gárikûn (fungus of *Agaricus igniarius*), ṣj; Himaj (unripe fruit of *Terminalis chebuli*), ṣj. Reduce the ingredients to a fine powder. Dose, gr. xv to gr. lx.

Useful as an aperient in diseases of the head and heart, and in constipation with deficient secretion of bile.

85. *Ṛ* Nisotar, ṣj; Harde, the pericarp of (ripe fruit of *Terminalis chebuli*), ṣss; Banafshá (plant of *Viola odorata*), ṣss. Reduce these to a fine powder. Dose, gr. x gr. xx.

Purgative. In diseases of the head and eye.

#### 46. GARMÁLO (pulp surrounding the seed of *Cathartocarpus fistula*) :

86. *Ṛ* Garmálo (the pulp without the seeds), ṣiv; Káli-drákhsh (raisins)

without seeds, ʒij; Gûl-kand (confection of roses), ʒvj; Badám tel (oil of sweet almonds), ʒij; Boiling water, ʒvij. Macerate for half an hour and strain. From ʒvj to ʒvij for a dose.

A mild and safe laxative in constipation and colic, diseases of the brain and fever.

87. ʔ Garmála (the pulp without the seeds), ʒij; Harde (pericarp of Chebulic myrobalam), ʒj; Mootha (root of *Cyprus rotundus*), ʒj; Piper (long pepper), ʒss; Boiling water, ʒx. Prepare five ounces of decoction in the usual way. Dose, from ʒij to ʒv of the decoction.

Use as the preceding formula.

47. REVAND-CHINI-LAKDI (the root *Rheum Emodi* or Chinese rhubarb), also called REVAND-CHINI-KHATÁI :

88. ʔ Revand-chini-Lakdi (Chinese rhubarb), ʒij; Gûláb-kali (dried buds of *Rosa centifolia*), ʒij; Boiling water, ʒxij. Prepare infusion in the usual way. Dose, ʒj to ʒij, with a little sugar.

A mild aperient in dyspepsia and constipation.

89. ʔ Revand-chini-Lakdi, ʒiv; Kásani (seed of *Cichorium intybus*), ʒvij; Bikhi-kásani (root of *Cichorium intybus*), ʒx; Gûláb-kali (dried buds of *Rosa centifolia*), ʒvj; Sugar, ʒvj; Distilled water, ʒxij. Bruise the first four ingredients, and macerate them in water for six hours, then boil for one hour, and strain; lastly, add the sugar to the strained fluid, and prepare six ounces of syrup in the usual way. Dose, ʒss to ʒj, with water.

In constipation, dyspepsia, passive congestion of the liver, jaundice, and suppressed and painful menstruation.

90. ʔ Revand-chini-Lakdi, ʒj; Har, the pericarp of (*Terminalia citrini*), ʒiss; Sakmûniá (gum-resin of *Convolvulus scammonia*), ʒss. Reduce the ingredients to a fine powder and mix. Dose, gr. xv to gr. xxx.

An efficient purgative in diseases of the liver and cerebral congestion.

48. INDRÁYÁNA or INDARVÁNÁ (dried decorticated fruit of *Cucumis colocynthidis*) :

91. ʔ Indráyána, ʒj; Bábul gonda (gum Arabic), ʒss; Harde (ripe fruit of *Terminalis chebuli*), ʒij; Bozidán (root of *Pyrethrum* ?), ʒss. Reduce these to a fine powder and mix. Dose, gr. xx to gr. xl.

A valuable cathartic in cerebral and hepatic congestion, dropsy, colic, and constipation.

92. ʔ Indráyána, ʒss; Eliá (aloes), ʒss; Elchee-dáná (cardamom seeds), ʒss; Harde, the pericarp of (the ripe fruit of *Terminalis chebuli*), ʒij; Piper (long pepper), ʒj. Reduce these to a fine powder and mix. Dose, gr. xxx to gr. xl.

In constipation, biliousness, and cerebral congestion.

49. JAMÁLGOTÁ (the seed of *Croton tiglium*) :

93. ʔ Jamálgotá-bija, gr. viij; Harda, the pericarp of (the ripe fruit of *Terminalis chebuli*), gr. xij; Kálá-miri (black pepper), gr. v ;

Sûntha (ginger), gr. iij. Rub these together, and add sufficient mucilage to make a pill mass, and divide into eight pills. Dose, one to two pills.

A powerful drastic purgative in obstinate constipation, ascites, anasarca, and diseases of the brain.

50. KÁLÁ-DÁNÁ (seeds of *Pharbitis nil*) :

94. R Kálá-dáná, ʒiss; Sendhe-lona (rock-salt), ʒj; Sûntha (ginger), ʒss. Reduce the ingredients to a fine powder and mix. Dose, from gr. xxx to lx.

A safe cathartic, and an excellent substitute for jalap.

51. REVAUCHINO-SHÍRO (Indian gamboge) :

95. R Revanchino-shíro (Indian gamboge), ʒss; Elio (aloes), ʒss; Harda the pericarp of the (ripe fruit of *Terminalis chebuli*), ʒiss; Sûntha (ginger), ʒss. Rub the ingredients separately to a fine powder, and beat them together, with syrup, into a uniform pill mass. Dose, gr. v to gr. x.

A valuable hydragogue cathartic in dropsies and obstinate constipation; also an useful anthelmintic.

52. ERANDI or ERANDIUN (the oil from seeds of *Ricinus communis*) :

96. R Erandiun (Indian castor oil), ʒij; Sûntha (ginger), ʒss; Gola (treacle), ʒss; Water, ʒj. Boil gently the ginger in water and strain; then mix this decoction, the oil, and treacle together. Dose, one third to half the quantity.

A mild and efficient purgative in colic, constipation, dysentery, &c.

53. VÁVADINGA BAIBERUNG (the berries of *Embelia ribes*) :

97. R Vávadinga, bruised, ʒiij; Boiling water, ʒiss. Prepare infusion in the usual way. Dose, for an adult, from ʒj to ʒij; for a child, one to two teaspoonfuls.

Useful for destroying worms.

98. R Vávadinga, ʒiss; Nisotar (root of *Ipomea turpethum*), ʒss; Kam-pílá (the powder covering the capsules of *Rottleria tinctoria*), gr. xl; Boiling water, ʒiiss. Prepare infusion in the usual way. Dose, for an adult, ʒj to ʒij; for a child, one to two teaspoonfuls, two or three times, till the bowels are freely moved.

An useful anthelmintic.

54. DALIMBA-MÛLA-SÁLA (the bark of Pomegranate root) :

99. R Dalimba-mûla-sála, ʒij; Water, ʒvj. Boil down to ʒiij and strain. Dose, ʒj to ʒij for an adult; one to two teaspoonfuls for a child.

An useful anthelmintic for children, and in tapeworms in adults.

100. R Dalimba-mûla-sála, ʒij; Kásni (seed of *Cychorium intebus*), ʒiij; Kúlfá-bija (seed of *Portulaca oleracea*), ʒij; Dháná (coriander), ʒiij; Cold water, ʒiij. Bruise the ingredients, rub them with water, and strain the infusion. Dose, ʒj to ʒij. One to three

teaspoonfuls, every three or four hours, to children suffering from worms, even when fever is also present.

55. KIRMÁNI-OVÁ or KIRMÁNI-AJMO (the flowers of *Artemisia Cabulica*) :

101. R Kirmáni ajmo, ʒj; Vávadinga (the berries of *Embelia ribes*), ʒj; Sugar, ʒiij. Reduce the ingredients to a fine powder and mix. Dose, ʒij to ʒiij for adults; gr. v to gr. x for children.

Useful for destroying worms.

56. KAMPÎLA (the powder covering the capsules of *Rottleria tinctoria*) :

102. R Kampîla, ʒj; Gola (treacle), ʒij. Mix. The whole to be taken by an adult for a dose, to expel worms and act as a purgative also.

103. R Kampîla, ʒiss; Vávadingá (berries of *Embelia ribes*), ʒj; Harde (*Chebulic myrobalans*), ʒiss; Sendhá-lona (rock-salt), ʒj. Rub the ingredients to a fine powder. Dose, from ʒj to ʒij, with treacle.

A very good purgative and anthelmintic.

DIAPHORETICS, REFRIGERANTS, AND DIURETICS.

57. KÁSANI (the mass of *Cichorium intebus*) :

104. R Kásani, ʒss; Kûlfá bija, or Tâkhmi kûrfá (the seeds of *Portulacea oleracea*), ʒiss; Water, ʒxij. Macerate for half an hour and strain. Dose, ʒij or ʒiij of the infusion with a little sugar, every two or three hours.

In the hot stage of fevers and inflammatory diseases.

105. R Kásani, ʒiss; Kûlfá binja (the seeds of *Portulacea oleracea*), ʒiss; Alû Bokhárá (fruit of *Prunus Bhokariensis*), No. 10; Water, ʒxij. Prepare infusion. Dose, from ʒij to ʒiij, with a little sugar, every three or four hours.

In the early stage of remittent and continued fevers.

106. R Banafshá, ʒiv; Kásni (the seeds of *Cichorium intebus*), ʒix; Jesh-timadha (liquorice root), ʒix; Sonfa (fennel), ʒvj; Water, Oij. Prepare 1 lb. of decoction in the usual way. Dose, from ʒij to ʒiv, every three hours.

In the early stage of fever, severe catarrh, and bronchitis.

58. UNÁB and SIPASTÁN :

107. R Unáb (dried fruit of *Zizyphus vulgaris*), No. 7; Sipastán (dried fruit of *Cordia myxa*), No. 10; Alû (fruit of *Prunus Bokhariensis*), No. 10; Kásni (seeds of *Cichorium intebus*), ʒiij; Banafshá (plant of *Viola odorata*), ʒij; Water, ʒxij. Prepare infusion. Dose, one third part every three hours.

In severe catarrh with sore throat, bronchitis, and rheumatic fever.



## 59. KHAS OR VÁLÁ :

108. Vála (the rhizoma of *Andropogon muricatus*), 3ij; Boiling water, 3vj.

Prepare infusion. Dose, 3j to 3ij every two hours.

As a refrigerant drink in the early stage of fever.

## 60. SHERBATE NILOFAR OR KAMALA-PHÛLA (syrup of Lotus flowers) :

109. R Nilofar (flowers of *Nymphaea lotus*), fresh, 1½ lb., or dried, ½ lb.

Sugar, 1 lb.; Water, 3 lb. Prepare 1 lb. of syrup in the usual way. Dose, from 3ss to 3j, with water.

In remittent and other high fevers, heat, apoplexy, and inflammatory diseases of the brain.

## 61. SHERBATE-UNAB :

110. R Unáb (dried fruit of *Zizyphus vulgaris*), 1 lb.; Water, 3 lb.; Sugar,

2 lb. Prepare 2 lb. of syrup in the usual way. Dose, from 3ss to 3j, diluted with twice its quantity of cold water.

In the early stage of fever, bronchitis, and pneumonia.

## 62. SHERBATE BANAFSHÁ (syrup of Viola) :

111. R Banafshá (plant of *Viola odorata*). Syrup to be prepared as the *Sherbate unab*. Dose, 3ss to 3j, diluted with water, three times a day.

In severe catarrh with sore throat, bronchitis, pneumonia, and inflammatory diseases.

63. VACHÁ VAJ OR BACH (the rhizome of *Acorus calamus*) :

112. R Vachá, 3ij; Atwisha (atecs), 3j; Harde (Chebulic myrobalans), 3ij. Rub these to a fine powder. Dose, from gr. xx to gr. xxx.

A valuable stimulant diaphoretic in low adynamic fevers.

64. ZOFÁ (the flowering plant of *Hyssopus officinalis*) :

113. R Zofá, 3ij; Jeshtimadha (liquorice root), 3iss; Angir (dried fruit of *Ficus carica*), No. 5; Water, Oj. Prepare half a pint of decoction in the usual way. Dose, from 3iij to 3iv, three times a day.

A valuable diaphoretic in catarrh and early stage of bronchitis and pneumonia.

## 65. KÁKDI and KHARBÛZ BIJA (cucumber seeds) :

114. R Kákdi bija (the seeds of *Cucumis sativus*), 3j; Kharbúz bija (the seed of *Cucumis melo*), 3j; Tarbúz bija (the seed of *Cucurbita citrallus*), 3j; Kasni (the seeds of *Chicorium intebus*), 3ij; Angûri-sarko (wine vinegar), 3x; Sugar, 3x; Water, 1 lb. Boil the seeds in water and strain; then add sugar and vinegar, and prepare 3x of syrup in the usual way. Dose, 3ss to 3j, mixed with water, three or four times a day.

A valuable diuretic in remittent and inflammatory fevers.

66. GOKHARÛ (fruit of *Tribulus lanuginosus*) :

115. R Gokharû, bruised, 3ij; Sonfa (fennel), 3j; Anisûn (fruit of

Pimpinella anisum), ३j; Javkhár (impure carbonate of potash), ३j; Boiling water, Oj. Boil down to half a pint, strain, and dissolve the potash salt. Dose, from ३ij to ३iij every four hours  
In gonorrhœa, painful micturition, and calculous affections.

116. R Gokharû, ३iv; Harde (fruit of Terminalis chebuli), ३iij; Amlá (fruit of Phyllanthus emblica), ३iij. Reduce these to a fine powder and mix. Dose, from ३ss to ३j, three times a day.

In gonorrhœa, gleet, and genito-urinary diseases.

67. ANISUM and NAVSÁGAR :

117. R Anisûn (fruit of Pimpinella anisum), ३ij; Sonfa (fennel), ३iss; Navságar or Shorá-khár (saltpetre), ३j; Boiling water, ३vij. Prepare infusion of the fruits in the usual way, and dissolve the saltpetre in the strained liquid. Dose, from ३ij to ३iij.

In dropsies and diseases of the genito-urinary organs.

68. MAZARIÛN and AFTIMÛN :

118. R Mazariûn (root of Daphne mezereum), ३j; Aftimûn (plant of Cascuta reflexa), ३iij; Sendhe-lona (rock-salt), ३ij; Boiling water, ३ix. Prepare infusion of the first two drugs and dissolve the salt in the strained liquid. Dose, from ३ij to ३iij.

A valuable diaphoretic and diuretic in dropsies, chronic rheumatism, and chronic skin diseases.

69. KABAB-CHINI or CHINI KABÁB :

119. R Kabáb-chini (fruit of Piper cubeba), ३j; Saná-makhi (leaves of Cassia lanciolata), ३j; Elchi-dáná (Cardamom seeds), ३iij; Pá-shan-bhedha (carbonate of iron and lime), ३iij; Ambá-halada (rhizome of Curcuma amada), ३j; Shorá-khár (nitrate of potash), ३ss. Reduce these separately to a fine powder, and then rub them together. Dose, from ३j to ३ij.

In gonorrhœa, gleet, and chronic diseases of the genito-urinary organs.

70. HABI-BALESÁN and MÛLA BIJA :

120. Habi-balesán (fruit of Balsamodendron gileadense), ३ij; Mûla bija (seed of Raphanus sativus), ३j; Sonfa (fennel), ३j; Javkhár (impure carbonate of potash), ३j. Rub the ingredients to a fine powder. Dose, from ३ss to ३j.

In chronic diseases of the bladder, urinary calculi, and dropsy.

EXPECTORANTS AND EMETICS.

71. KÁKRÁŚINGA (galls on Rhus Kakrasingee) :

121. R Kákrášinga, ३j; Káyaphal (bark of Myrica sapida), ३j; Káli-drakhsh (raisins), ३j. Reduce the dry ingredients to powder. Mix well. Dose, ३ss to ३j, three times a day, with honey.

In bronchitis (especially in dry coughs) and asthma.

72. ARUSHÁ or ADUSHÁ (leaves of *Justicia adhatoda*) :

122. R. Arushá, leaves, ʒiij; Piper (long pepper), ʒss. Prepare ʒiij of decoction in the usual way. Dose, ʒj three times a day.

123. R. Arushá, root, ʒvj; Gulvela (stem of *Cocculus cordifolius*), ʒvj. Prepare ʒiij of decoction in the usual way. Dose, ʒj three times a day.

In bronchitis, catarrh, asthma, and even said to be very useful as an expectorant in phthisis.

73. BHUI-RINGNI (the root of *Solanum Jacquinii*) :

124. R. Bhui-ringni-múl, ʒiv; Boiling water, ʒvj. Prepare ʒiij of decoction in the usual way. Dose, ʒj three times a day, with a little honey.

125. R. Bhui-ringni-múl, ʒiv; Adushá (leaves of *Justicia adhatoda*), ʒiv; Boiling water, ʒviij. Prepare ʒvj of decoction in the usual way. Dose, ʒij three times a day.

An esteemed expectorant in catarrh, bronchitis, asthma, and pleurisy.

74. BANAFSHÁ (plant of *Viola odorata*) :

126. R. Banafshá, ʒvj; Jeshtimadha (liquorice root), ʒii; Water, ʒvj. Prepare ʒvj of infusion in the usual way. Dose, ʒij three times a day.

A very good expectorant in bronchitis and pneumonia.

127. R. Banafshá, ʒvj; Jeshtimadh-no-shiro (extract of liquorice), ʒiij; Tùkhmi-khatmi (seed of *Athæa rosea*), ʒiij. Reduce these to a fine powder, add esphagúl water to form a pill mass, and prepare trochisci. Dose, ʒij of the dry trochisci powdered, three times a day.

In bronchitis, pneumonia, and pleurisy.

128. R. Banafshá, ʒvj; Unáb (dried fruit of *Zizyphus vulgaris*), No. 10; Sipastan (dried fruit of *Cordia myxa*), No. 20; Angir (dried figs), No. 5; Tùkhmi-khatmi (seed of *Althæa rosea*), ʒx; Aquæ, 3 lb. Prepare 1 lb. of decoction in the usual way. Dose, from ʒij to ʒiij, three times a day.

In severe catarrh, with sore throat, bronchitis, and pneumonia.

75. ZOFÁ (the flowering plant of *Hyssopus officinalis*) :

129. R. Zofá or Zofá-i-yábes, ʒiv; Tùkhmi-khátmi (seed of *Althæa rosea*), ʒiv; Khabázi (carpel of *Malva Sylvestris*), ʒiv; Jeshtimadha (liquorice root), ʒv. Prepare 1 lb. of decoction in the usual way. Dose, from ʒij to ʒiij, three times a day.

In bronchitis and pneumonia.

130. R. Zofá-i-yábes, ʒx; Khas-khas (seed of *Papaver somniferum*), ʒx; Dhanía (coriander), ʒx; Anisum (fruit of *Pimpinella anisum*), ʒx; Tùkhmi-khatmi (seed of *Althæa rosea*), ʒx; Jeshtimadha (liquorice root), ʒvj; Unáb (fruit of *Zizyphus vulgaris*), No. 100; Sipastan (fruit of *Cordia myxa*), No. 100; Boiling water, Oiv. Macerate for twelve hours, then boil down till half the quantity

of water remains, and strain. Add 2 lb. of sugar, and prepare syrup in the usual way. Dose of this compound syrup of *zofá* is from ʒiv to ʒj, diluted with water.

In catarrh, bronchitis, pneumonia, and phthisis.

76. BIHIDÁNÁ and ISÁBÁGUL :

131. R Bihidáná (seed of *Cydonia vulgaris*), ʒij; Isbag or Isphagul (seed of *Plantago ispaghul*), ʒij; Tûkhmi-khatmi (seed of *Althæa rosea*), ʒij; Water, ʒx. Macerate for half an hour, stir constantly for a few minutes till a thin mucilage is formed, and strain. Dose, from ʒij to ʒiv, three or four times a day.

As a demulcent and emollient in catarrhal affections of the throat and pulmonary mucous membrane, and renal diseases.

77. GÁRIKÛN (fungus of *Agaricus igniarius*) :

132. R Gárikûn, ʒij; Jeshtimadh-no-shiro (extract of liquorice), ʒj. Powder the drugs separately, and then rub them together. Dose, from gr. x to gr. xl, three times a day, with a little honey.

In spasmodic coughs.

78. BADÁM and DOODHI-MAGZ :

133. R Badám magz (sweet almonds), ʒx; Doodhi-magz (decorticated seed of *Lagaria vulgaris*), ʒv; Kakdi-magz (decorticated seed of *Cucumis sativus*), ʒv; Tûkhmi-kûrfá, or Kûlfá-beej (seed of *Portulaca oleracea*), ʒv; Tûkhmi-káhu (seed of *Lactuca sativa*), ʒv; Khas-khas (seed of *Papaver somniferum*), ʒij; Babûl-gonda (gum Arabic), ʒiv; Badám-tela (oil of sweet almonds), ʒij; Sugar, ʒij. Rub the decorticated seeds together till a homogeneous mass is formed, then add powdered gum, sugar, and a sufficient quantity of the almond oil so as to form an electuary. Dose, ʒij to ʒvj, three times a day.

Emollient, demulcent, and nutritive in irritating coughs.

79. SAKARI-TIGÁL and BADÁM :

134. Sakari-tigál (cell of a beetle of the family *Lamellicarnes*), ʒj; Badám magz (sweet almonds), ʒj; Pastán (seed of *Pistacea lenticus*), ʒj; Babûl-gonda (gum Arabic), ʒj; Báklá (seed of *Vicia faba*), ʒj; Sûntha (ginger), ʒj. Rub the seeds together and reduce the other drugs to a fine powder, and then mix together to form a pill mass. Dose, from gr. v to gr. x. To be kept in the mouth two or three times a day.

In old coughs.

80. JANGLI-KÁNDÁ (Jangli Piáz) :

135. R Jangli-kándá (dried bulb of *Urginia indica*), ʒj; Anjir (dried figs), ʒvj; Anisum (fruit of *Pimpinella anisum*), ʒiv; Kalidraksh (raisins), ʒij; Shed, or madh (honey), 2 lb.; Water, Oij. Prepare syrup in the usual way. Dose, from ʒss to ʒj, diluted with water.



A very good expectorant and diuretic in old coughs and disease of the respiratory organs.

81. SELÁRÁS and AFIM :

136.  $\mathcal{R}$  Selárás (balsam of Liquidamber Orientalis),  $\mathfrak{z}$ iiss; Afim (opium), gr. xv; Jundi-bidastar (castoreum),  $\mathfrak{z}$ iss. Mix and add sufficient mucilage to form a pill mass. Dose, from gr. v to gr. x.

In chronic bronchitis, spasmodic coughs, asthma, and chronic coughs of the aged.

82. NAVSÁGÁR (chloride of ammonia) :

137.  $\mathcal{R}$  Navságar,  $\mathfrak{z}$ ij; Jeshtimadh (liquorice root),  $\mathfrak{z}$ ss; Boiling water,  $\mathfrak{z}$ vii $\mathfrak{j}$ . Prepare infusion of the liquorice root only in the usual way, and dissolve the sal ammoniac in the strained infusion. Dose, from  $\mathfrak{z}$ j to  $\mathfrak{z}$ ij, three times a day.

In chronic coughs, especially those of old people.

83. MUDÁR or AKRÁ (root-bark of Calotropis gigantia) :

138.  $\mathcal{R}$  Mudár powder, gr. xxx to gr. lx. As an emetic in all cases where ipecacuanha is useful.

## NARCOTICS AND SEDATIVES.

84. AFIN or AFIM (Indian opium) :

139.  $\mathcal{R}$  Afim (Indian opium), gr. xij; Tûkhmi-káhú (seed of Lactuca sativa),  $\mathfrak{z}$ ss; Kálá-mari (black pepper),  $\mathfrak{z}$ ss; Piper (long pepper),  $\mathfrak{z}$ ss; Sûnthá (ginger), gr. xx. Reduce the ingredients to a fine powder, and add mucilage of accacia to form a pill mass, and divide into twenty-four pills. Dose, from one to two pills.

To relieve pain and produce sleep in chronic painful diseases.

140.  $\mathcal{R}$  Afim (Indian opium), gr. xx; Taja (cinnamon),  $\mathfrak{z}$ ss; Lavang (cloves),  $\mathfrak{z}$ ss; Kapûr (camphor),  $\mathfrak{z}$ j. Beat the powders well into a mass with mucilage of gum arabic, and divide into forty equal pills. Dose, from one to two pills.

In acute diarrhoea, first stage of cholera, and in painful spasmodic affections.

85. BHÁNGA or SÁBJEE :

141.  $\mathcal{R}$  Bhánga (large leaves and capsules of Cannabis indica),  $\mathfrak{z}$ j; Jáe-phal (fruit of Myristica officinalis),  $\mathfrak{z}$ ss; Elchee (cardamoms),  $\mathfrak{z}$ ss; Mastaki (mastic),  $\mathfrak{z}$ ss; Taja (cinnamon),  $\mathfrak{z}$ ss; Sugar,  $\mathfrak{z}$ ii $\mathfrak{j}$ . Reduce these to a fine powder and mix. Dose, from gr. xx to gr. lx.

In tetanus, neuralgia, chronic rheumatism, and nervous affections attended with pain.

142.  $\mathcal{R}$  Bhánga (large leaves and capsules of Cannabis indica),  $\mathfrak{z}$ j; Kálá-mari (black pepper),  $\mathfrak{z}$ ss; Kakdimagz (decorticated seed of Cucumis sativa),  $\mathfrak{z}$ ss; Tarbuz-magaz (seed of Cucumis melo),

३j; Khas-khas (poppy seeds), ३j; Sugar, ३ij; Milk, ३v; Water, ३vj, Rub the ingredients separately to powder, mix them together in a large stone mortar, adding the water gradually; strain through calico, and then add milk and sugar. Dose, from ३vj to ३xij.

An ordinary intoxicating beverage used by the natives. Useful in sleeplessness and chronic nervous diseases attended with pain.

143. *Ṛ Gánjá* (dried flowering plant from which the resin has not been removed), ३ss to ३iss. To be mixed with a little tobacco, and smoked in an ordinary pipe.

In asthma and spasmodic diseases.

86. *DHATŪRÁ* OR *DHAUTŪRÁ-VIJA* :

144. *Ṛ Dhauturá* or *Dhauturá-vija* ३j (seeds of *Datura alba*), ३ss; *Piper* (long pepper), ३ss; *Sūtha* (ginger), ३ss; *Kálá-mari* (black pepper), ३ss. Reduce the ingredients to a fine powder. Dose, gr. iv, gradually and cautiously increased to gr. x.

In chronic rheumatism, spasmodic asthma, epilepsy, and chronic painful diseases.

87. *BACHNÁG* OR *VACHNÁG* :

145. *Ṛ Bachnág* (root of *Aconitum ferox*), ३ss; *Lavang* (cloves), ३ss; *Piper* (long pepper), ३ij; *Gandhak-phúl* (Sulphur sublimate), ३ij; *Kálá-mari* (black pepper), ३ij. Prepare three-grain pills. Dose, one pill, cautiously increased to two or three at a time.

In chronic rheumatism, neuralgia, tetanus, diseases of the heart, and dyspepsia.

88. *KHAS-KHAS* AND *TUKHMI-KAHŪS* :

146. *Ṛ Khas-khas* (seed of *Papaver somniferum*), ३ij; *Túkmi-káhū*, ३j; Sugar, ३iv. Rub these to a fine powder. Dose, from gr. xx to gr. xl.

In insomnia.

89. *ASGANDHA* AND *AFIM* :

147. *Ṛ Asgandha* or *Asagandh* (root of *Physalis somnifera*), ३vj; *Gulvela* (stem of *Cocculus cordifolius*), ३vj; *Afim* (opium), ३ss. Reduce these to a fine powder. Dose, from gr. x to gr. xxiv.

In chronic rheumatism, lumbago, and painful nervous diseases.

STIMULANTS, TONICS, AND ANTIPERIODICS.

90. *ATWISHA* OR *ATVAS-NI-KALI* (*Atis*) :

148. *Ṛ Atwisha* (root of *Aconitum heterophyllum*) finely powdered. Dose, from gr. v to gr. x, as a tonic in general debility, and from gr. x to gr. xx, as an antiperiodic in malarious fevers.

149. *Ṛ Atwisha* (root of *Aconitum heterophyllum*), ३j; *Ságargotá* (seed of *Guilandina bonducella*), ३ij. Reduce to a fine powder. Dose, from gr. x to gr. xx.

150. *Ṛ* Atwisha (root of *Aconitum heterophyllum*), ३j; Mothá (root of *Cyprus rotundus*); Gúlvēla (stem of *Cocculus cordifolius*), ३j; Sūntha (ginger), ३ss. Reduce the ingredients to a fine powder. Dose, from gr. x to gr. xxx.

As a tonic and antiperiodic in malarious fevers and debility.

151. *Ṛ* Atwisha (root of *Aconitum heterophyllum*), ३j; Mothá (root of *Cyprus rotundus*), ३j; Kákdá-singi (galls of *Rhus kákrá-singee*), ३j. Reduce these to a fine powder. Dose, from gr. xv to gr. xxx.

In old fevers and coughs.

152. *Ṛ* Atwisha (root of *Aconitum heterophyllum*), ३j; Kariátûn (plant of *Ophelia chirata*), ३j; Mothá (root of *Cyprus rotundus*), ३j. Reduce to a fine powder. Dose, from gr. xx to gr. xl.

In fevers and general debility.

#### 91. CHIRATÁ OR KARIÁTÛN :

153. *Ṛ* Kariátûn (plant of *Ophelia chirata*), ३ij; Gúlvēla (stem of *Cocculus cordifolius*), ३ij; Amlá (fruit of *Phyllanthus emblica*), ३j; Jadvár (root of *Delphinium pauciflorum*), ३j. Reduce the ingredients to a fine powder. Dose, from gr. xx to gr. xl.

A very good tonic and febrifuge. In chronic fevers, debility, and dyspepsia.

154. *Ṛ* Kariátûn (plant of *Ophelia chirata*), bruised, ३ij; Piper (long pepper), bruised, ३ss; Kálá-mari (black pepper), bruised, ३j; boiling water, ३x. Infuse in a covered vessel for half an hour and strain. Dose, from ३j to ३ij.

In intermittent fevers, dyspepsia, and general debility.

#### 92. GÚLVELÁ OR GALO :

155. *Ṛ* Gúlvēlá (stem of *Cocculus cordifolius*), ३ij; Kariátûn (plant of *Ophelia chirata*), ३ij; Mothá (root of *Cyprus rotundifolius*), ३j; boiling water, ३x. Prepare infusion in the usual way. Dose, from ३j to ३ij.

In old-standing fevers, dyspepsia, chronic rheumatism, and in convalescence after many exhausting diseases.

#### 93. AFTIMÛN, COMPOUND DECOCTION OF :

156. *Ṛ* Aftimûn (plant of *Cascuta reflexa*), ३v; Bisfáez (rhizome of *poly-podium*), ३j; Ustekhúdûs (flower of *Lavandula ustachus*), ३ij; Shahterá (leaves of *Origanum vulgare*), ३ij; Bádranjboyá (plant of *Melissa umbrosa*), ३ij; Gáoabáb (leaf of *Onosma bracteatum*), ३iii; Banafshá (plant of *Viola odorata*), ३ij; Water, Oij. Boil down to one third the quantity of water and strain. Dose, from ३j to ३ij with a little sugar.

Useful as a nervine tonic in melancholia and chronic diseases of the nervous system.

#### 94. AFTIMÛN :

157. *Ṛ* Aftimûn (plant of *Cascuta reflexa*), ३j; Bisfáez (rhizome of *Poly-podium*), ३j; Gárekûn (fungus of *Agaricus igniarius*), ३iiss;

Sendhe-lona (rock salt), ʒj. Reduce the ingredients to a fine powder and mix. Dose, from gr. xxx to gr. xl.

In chronic rheumatism, sciatica, and chronic diseases of the nervous system.

95. SŪRANJÁN (Indian colchicum) :

158. ʔ Sŭranján (the corm of *Hemodactylos* or Indian colchicum), ʒss ; Motha (root of *Cyprus rotundus*), ʒj ; Bozidán (root of *Pyrethrum* species), ʒss. Reduce the ingredients to a fine powder. Dose, ʒss to ʒj.

In chronic rheumatism and gout.

96. GÁOZABÁN COMPOUND SYRUP OF :

159. ʔ Gáo zabán (leaves, &c., of *Onosma bracteata*), ʒx ; Gûle-gáfecz (flowers of *Saponaria vaccaria*), ʒv ; Bádranj boyá (plant of *Melissa umbrosa*), ʒiij ; Sugar, ʒx ; Water, Oj. Prepare ʒx of syrup in the usual way. Dose, from ʒj to ʒiss, diluted with water.

A very good tonic in palpitation and diseases of the heart, and chronic diseases of the nervous system.

97. USTEKHÛDÛS, COMPOUND DECOCTION OF :

160. ʔ Ustekhûdûs (flowers of *Lavandula ustachus*), ʒiij ; Gûle-bábúná (flowers of *Matricuria graveolens*), ʒiij ; Bisfáecz (rhizome of *Polypodium*, ʒiv ; Uriále (fruit of *Zizyphus vulgaris*), No. 10 ; Suranján (corm of *Hemodactylas* or Indian colchicum), ʒj ; Water, Oj. Boil down to one third the quantity of water. Dose, from ʒij to ʒiv, with a little sugar.

In melancholia, chronic nervous diseases attended with pain, chronic rheumatism, and chronic skin diseases.

98. GŪLÁB-KALI and MOTHÁ :

161. ʔ Gûláb-kali (dried buds of *Rosea centifolia*), ʒv ; Motha (root of *Cyprus rotundus*), ʒiss ; Jeshtimodh (liquorice root), ʒiiss ; Kásni (seed of *Cichorium intebus*), ʒij ; Kákdi-magz (decorticated seed of *Cucumis sativus*), ʒij. Reduce these to a powder, and prepare lozenges with water. Dose, ʒj to ʒij of the dry lozenges powdered and mixed with a little sugar.

In old standing fevers and convalescence from disorders of the stomach.

99. MÁLKANGNI and TEJBALA :

162. ʔ Málkangni (root of *Celastrus paniculata*), ʒj ; Tejbala (capsules of *Zanthoxylon rhetsa*), ʒij ; Mûsli (root of *Carculigo brevifolia*), ʒij ; Ratonjotá (root of *Anchusa tinctoria*), ʒij ; Piper (long pepper), ʒij. Reduce these to a fine powder and mix. Dose, from gr. x to gr. xxx.

In chronic rheumatism and chronic nervous diseases.

100. JUDVÁRA :

163. ʔ Judvára (root of *Delphinium pauciflorum*), ʒj ; Ambar (hardened fæces of *Physeter macrocephalus*), ʒj ; Kesar or Záfrán (saffron),



5j. Rub the powders together, mix with rose water, and prepare five-grain pills. Dose, one to two pills.

An useful tonic in diseases of the heart, brain, spermatorrhœa, and weakness of the organs of generation.

101. KALAM-KÁNCĤRI :

164. R̥ Kalam-káncĥri or Kalumba (Columba root), 5ss; Revandchini (rhubarb), gr. x; Sûntha (ginger), 5ss. Reduce these to a powder. Dose, from gr. x to gr. xx.

In general debility and atonic dyspepsia.

102. NIMBA OR LIMDO :

165. R̥ Nimb-chál (the bark of *Azadiractæ Indica*), 3j; Lavang (cloves), 3j; Piper (long pepper), 3iss; water, lbj. Prepare decoction in the usual way. Dose, from 3j to 3iij every three hours.

In malarious fevers, atonic dyspepsia, and general debility.

103. AFSANTINE and KASTURI :

166. R̥ Afsantine-rumi (flowering plant of *Artemisium doonense*), 3iij; Karfas (fruit of *Opium graveolens*), 3ij; Sumbul (sumbúl root), 5ij; Kastûri (musk), 3ss; Jûndibidastor, 3ss. Reduce these to a fine powder. Dose, from gr. xx to gr. xl.

A very useful stimulant tonic in hysteria, chronic nervous diseases, affections of the heart, and general debility.

104. KASTÛRI and KAPÛR :

167. R̥ Kastûri (musk), 3ss; Kapûr (camphor), 3; Umbar (the hardened fæces of *Physeter macrocephalus*), 3ss; Tukhmi-Farunjamusk (seed of *Ocimum lensilicium*), 5ij. Rub together and mix well. Dose, from gr. v to gr. xx.

As a tonic or stimulant.

105. KÛCHLÁ OR ZEHERI-KÛCHÍÁ :

168. R̥ Kûchlá (seed of *Strychnos Nux vomica*), 5ss; Kálá-miri (black pepper), 5j; Harde (fruit of *Terminalis chebuli*), 5iiss. Reduce these to a fine powder and mix well. Dose, gr. v, gradually and cautiously increased to gr. x to even gr. xx.

A valuable nervine tonic in neuralgia, chronic paralysis, spermatorrhœa, and general debility.

## GARGLES, LOTIONS, LINIMENTS, &c.

106. BÁBÛL-KÁ-CHÁL (bark of *Acacia Arabica*) :

169. R̥ Bábûl-ká-chál, 3ij; Boiling water, Oj. Prepare decoction in the usual way.

A very good astringent wash for sloughing and other sores, prolapsus ani, and an injection in leucorrhœa.

170. R̥ Decoction of Bábûl bark, Oj; Fitakrí (alum), 3iij. Mix.

As a local astringent in prolapsus ani and leucorrhœal discharge.

107. SAFEDO (oxide of lead) :

171.  $\mathcal{R}$  Safedo (oxide of lead),  $\mathfrak{z}\text{ij}$ ; Bábûl-gonda (gum Arabic),  $\mathfrak{z}\text{ij}$ ; Gûláb (rose-water), quantity sufficient. Rub the ingredients in rose-water to form a thin emulsion.

A useful application to relieve irritation of prurigo, eczema, and other skin diseases.

108. SAFEDO and GILI-ARMANI :

172.  $\mathcal{R}$  Safedo (oxide of lead),  $\mathfrak{z}\text{ij}$ ; Gili-Armani (Armenian bole),  $\mathfrak{z}\text{iv}$ ; Ratánjri (red sandal wood),  $\mathfrak{z}\text{ij}$ ; Akákíá (extract of the pods of Acacia Arabica),  $\mathfrak{z}\text{ij}$ . Reduce the ingredients to a fine powder and mix well.

Useful in prurigo and skin diseases, attended with local heat and redness.

109. CHANDAN OR SANDAL :

173.  $\mathcal{R}$  Sandal (the wood of Santalum album), a piece; Gûláb (rose-water),  $\mathfrak{z}\text{vj}$ . Rub the sandal wood on a stone with a small quantity of rose-water at a time till the whole is rendered into a thick emulsion.

An useful cold application for the forehead in headache and fevers, and for the skin in prurigo and other skin diseases attended with local irritation.

110. FATKI (Bazar alum) :

174.  $\mathcal{R}$  Fatki (Bazar alum),  $\mathfrak{z}\text{ss}$ ; Rose-water,  $\mathfrak{z}\text{viij}$ . Mix.  
As an eye-wash in ophthalmia.

111. TANKAN-KHÁR OR SOBÁGO :

175.  $\mathcal{R}$  Tankan-khár (borax),  $\mathfrak{z}\text{j}$ ; Water,  $\mathfrak{z}\text{j}$ . Mix.

As a lotion to sore nipples. Diluted with an equal quantity of cold water it is very useful in allaying distressing irritation of the genital organs, and other skin diseases.

176.  $\mathcal{R}$  Tankan-khár (borax),  $\mathfrak{z}\text{j}$ ; Ghee (clarified butter),  $\mathfrak{z}\text{j}$ . Mix and prepare ointment.

An useful application for sore nipples, nettle-rash, prickly heat, and other skin diseases.

177.  $\mathcal{R}$  Tankan-khár,  $\mathfrak{z}\text{j}$ ; Madh or Shed (honey),  $\mathfrak{z}\text{j}$ . Mix.

An efficient application for aphthæ, and fissures or cracks in the mouth.

112. NAVSÁGAR :

178.  $\mathcal{R}$  Navságar (sal ammoniac),  $\mathfrak{z}\text{ij}$ ; Water, Oss to Oj.

As a lotion for bruises, sprains, local inflammation of the skin, and headache.

113. ROSÁ-KÁ-TEL (lemon-grass oil) :

179.  $\mathcal{R}$  Rosá-ká-tel (oil obtained from Andropogon citratus),  $\mathfrak{z}\text{j}$ ; Til-ká-tel, or Mithû tel (Sesamun oil),  $\mathfrak{z}\text{j}$ . Mix.

Useful as a liniment in chronic rheumatism, neuralgic pains, sprains, and painful muscular affections.

## 114. KOKAM-KÁ-TEL (Kokam butter) :

180. ℞ Kokam-ká-tel (concrete oil of the seeds of *Garcinia purpurea*), ʒss ;  
Ghee (clarified butter), ʒss. Dissolve by a gentle heat.

An emollient application for chronic skin diseases, fissures on the lips, and chaps on the hands.

## 115. GULÁB-KA-TEL or ROGANE-GŪL :

181. ℞ Gúláb-ká-tel (rose oil). Prepared by macerating petals of rose flowers in Mitha tel (sesami oil).

It is useful as an application in chronic rheumatism, muscular pains, and paralysis.

## 116. NIMBA or LIMDO :

182. ℞ Nimba-kálá (leaves of *Azadiracta indica*), heated over boiling water, or bruised and heated with water to form a poultice.

A very useful poultice to indolent ulcers and abscesses.

## 117. CHITRÁ-MŪL or LÁLCHITRAK :

183. ℞ Chitrá-múl (the root of *Plumbago rosea*, or *Zelanyca*), powdered, and Akdá-nû-dûdh (juice of *Calotropis procera*), equal parts, and mix well.

An useful application to raise a blister.

## HISTORY OF MEDICINE.

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THE COLLEGE,  
ST. BARTHOLOMEW'S HOSPITAL,  
*January 8th, 1879.*

DEAR DR. KHORY,

I am glad to hear that you wish to conclude your book with some account of the History of Medicine; for the history of science is something more than a mere investigation of what has been. It is in some degree a guide in the present and to the future. It shows why progress was made, and how, and what is of scarcely less importance, it demonstrates why, in long periods, science was stationary, and how it was extricated from methods which could lead to nothing new. The physician who would advance medicine must know how his predecessors advanced it, he can thus use their successes as a step to further success, while their errors and false steps will warn him how he is likely to go astray. For this practical reason, and not merely to indulge antiquarian fancies you are right to include in your 'Digest of Medicine' a short account of the history of the science. I can in this letter, of course, only give you a few main outlines, but perhaps enough to enable the student to fill them in with details to any extent that he may wish. It will be something if he learns that medicine has a continuous history and that the physicians of the past were many of them the worthy predecessors of even the most distinguished men of our own day. The newest book is indeed not always the best, and it is often better worth while to read the first author who wrote upon a disease than the last.

In examining the history of medicine and seeking for the origin of the science, the first body of teaching which one comes upon is the collection of writings known as the works of Hippocrates. The whole science can be traced to this point and then comes to a sudden stop. These works exhibit an amount of thought and of knowledge, and a collection of observation which no man could



have originated if nothing had gone before him. Hippocrates lived twenty-two centuries ago. He was living in the time of Plato, who twice mentions him in his works. Aristophanes refers to him, and both as if he were their contemporary. There is no doubt that he was an actual personage, that the Island of Cos was his native country, and that he was a member of a family devoted to medicine. That medical books and thoughts existed before him, there can be no doubt: traces of them are discoverable in his works, and if they were not, we know from the literature of the time that physicians, as distinguished from mere sorcerers existed in his time, or before him. For example, Thucydides\* mentions that many physicians were victims of the Athenian plague of B. C. 428; and even in Homer it is clear that some degree of proficiency in the treatment of wounds had become the province of particular men. Among the Egyptians and the Chinese we may be sure that the knowledge of anatomy, which we know existed, was not unaccompanied by some rudiments of medicine and surgery. The acquirements of these remote times are matter of conjecture and offer little, if any, definite instruction. Hippocrates is the beginning of medicine. He was a great man, worthy to be the originator of a science, and he lived in an age which can never be forgotten while literature, history, art, or philosophy are remembered. He lived in the century of Pericles, the century in which lived Socrates, the greatest moralist of ancient times; Thucydides, their greatest historian; Plato, the first of metaphysicians; Phidias, the first of sculptors; Æschylus, Sophocles, Euripides, and Aristophanes, the greatest masters of the ancient drama. In short, he was a great man in the most famous time of the ablest race of the ancient world. In considering the state of medicine as exhibited by Hippocrates, it must be first borne in mind that anatomy and physiology in our sense of the terms were almost unknown; the precise structure and the precise function of no one organ had been accurately described. This fact makes it far from easy to explain the Hippocratic teaching to a modern student of medicine. I shall perhaps do best if I give a sort of abstract of what he actually attempts. First of all, then, he pays great attention to the cause of disease. He divides causes into two kinds, the first includes the influence of the seasons, of the temperature, of waters, and of places. The second group refers more particularly to the

\* For at first neither were the physicians able to cure it through ignorance of what it was, but died fastest themselves, as being the men that most approached the sick.—(Hobbes, 'Thucydides,' Book II.)

individual, and includes the individual nutrition of each man, and his actions. In his opinion each season has its peculiar constitution or effect upon the human body, and exceptional seasons give rise to exceptional conditions of body. Carried to an extreme, this doctrine sounds absurd, but we may perceive in it the basis of the modern observation that particular seasons have particular epidemic characters. Hippocrates regards climate as having the influence of the season it resembles, in fact, as a sort of permanent season. Age too was considered as a kind of season. Each age exposes the individual to particular affections. The human body, according to Hippocrates, has an innate heat, of which the quantity is at its maximum during childhood, and which gradually diminishes during old age, when it reaches its minimum. He regards these changes of the innate heat as analogous to the changes of the solar solstice. Exercise and nutrition are considered as they are well, or ill regulated; and it is remarkable that Hippocrates had observed the bad results of what is called overtraining in athletes.

In this doctrine of causation, the general character of ancient medicine appears. It takes a broad general view. Modern medicine inspects things in detail and thus mounts to generalizations. In Hippocratic etiology everything was observed on the exterior: hurtful humours, climate, temperature, but never internal function. According to Hippocrates, health is due to a definite mixture of humours. This he calls the *crasis*. Disease is due to derangement of this *crasis*. An appendage to this was the doctrine of *coction*. By *coction* he meant the change which the humours underwent in the course of a disease. Thus the basis of the Hippocratic pathology is that every disease is due to some substance which puts out of order the animal economy. To change this substance from its crude condition to a state of *coction*, and when it has undergone *coction* to evacuate it; this was the object of treatment. Thus, in a case of bronchitis, the thin sputum was the hurtful humour, the opaque sputum the humour which had undergone *coction*, and the treatment was supposed to have brought about the *coction* and to evacuate its products, thus making the cure complete. Affections were considered incurable in which no *coction* could be observed, cancer for example. The efforts for the expulsion of a humour which had undergone *coction* constituted a crisis, and it was a part of the doctrine that a crisis was only likely to occur on particular days. The term prognosis has a much wider sense in the Hippocratic writings than at the present day. It dealt at the same time with

the past and the present, as well as the future of the disease. It instructed on the past, because its method supplied what the patient could not tell. It dealt with the present, because it pointed out the difference between the patient's state of health and sickness, and by the degree of difference showed the danger in which the patient was, the chances of health which remained to him, and the actual intensity of the disease. Finally, it thought about the future because it pointed out the signs which announced the crudity or coction of the humours, and the approach of the crisis. If a humour was not expelled at the crisis, it might be deposited in some particular region forming an apostasis. To sum up. Disease is caused by a disturbance of crasis due to a morbid substance, this substance is at first crude, it undergoes coction, and, on a particular day, comes into a state of crisis, which is characterised by a complete evacuation from the body, or by a deposit if recovery is to take place. If recovery is not to take place, either coction does not occur, or if it have occurred, neither evacuation nor apostasis has followed. The morbid substance remains in the system and kills the patient.

Hippocrates has left to us a careful description not so much of many diseases, in our sense, as of many symptoms; and there is no author whose writings are more likely to lead the physician to think upon his own observations. Such is the pathological doctrine of Hippocrates, and on it hangs whatever he has to say on treatment. He was essentially a practitioner, a man whose object was the cure of disease. I ought to add that he did not only occupy himself with diseases, but with the physician, desiring that he should always be devoid of blame in the practice of his art, and that he should obtain consideration and respect. To the lofty tone, to the public spirit, to the hatred of imposture, which are to be found throughout the Hippocratic writings, is perhaps due the liberal spirit which with rare exceptions has animated the members of our profession and to to which the respect accorded to them has been due. Before I leave Hippocrates, I ought to add that in one more point he was an example to the physicians of our own time. He wrote in a clear, concise, and dignified style, and his composition has been thought by scholars not inferior to that of his contemporary, Thucydides, the most dignified of all writers of history. Let those men of science who think that their subject can gain nothing from a literary style, remember this, and believe that good medicine deserves good English.

Medicine made but little real progress from the days of Hippocrates to modern times, and was perhaps the last branch of ancient

learning which profitted by the revival of letters. Most of the bulky volumes of those long centuries may be allowed to sleep like their authors in dust, but a few names are so well known as to be part of history. Galen among the writers in Greek, and Celsus of the writers in Latin, are the most famous.

Galen was born at Pergamos, in Asia Minor, in 131 A.D. His father, who was an architect, gave him a good education, and he was early and thoroughly imbued with the Aristotelian philosophy. After his father's death Galen studied at Smyrna and at Corinth and, finally, at Alexandria. Alexandria was then the chief school of medicine in the civilised world, and was especially remarkable for the attention which its professors had given to anatomy. In the term *torcular Herophili* our anatomical text-books retain a memorial of one of the teachers in this famous school. Galen made further travels, and settled in practice at Rome. The characteristic of the system of Galen is his preference to procedure on theory over procedure on the varying results of personal observation. His practice was to decide that the case before him belonged to one of his preconceived classes, and then to treat it according to the rules laid down for that class, instead of examining each case from the beginning in all its details as a new subject, and varying the treatment to suit its peculiarities. He always acted on general considerations; too often without regard to what was immediately before his eyes. He looked on the works of Hippocrates as a species of sacred writings, and his theories proceeded on the assumption that everything in Hippocrates was true. In many instances Galen misunderstood his great predecessor. He altogether differed from him in method without knowing it, and he used the aphorisms of Hippocrates, not as an admirable exposition of the results of the labours of a great observer, but as the immutable principles drawn up by an infallible teacher. Galen was a pagan, but the admiration which he always expresses for the works of the Creator, and his conviction of the goodness and wisdom of Providence procured for him the respect of Christian times, and in the middle ages he, like Aristotle, was regarded as a writer scarcely less deserving of respect than a father of the church. Such was the exaggerated and undoubting respect paid to his writings that when Vesalius in the sixteenth century demonstrated that the descriptions of Galen did not correspond with the anatomy of man, the great anatomist for some time found himself confronted by two schools of adversaries. The first maintained, in spite of their eyes, that Vesalius was wrong and Galen right, and the second unable to disbelieve their own eyes, but



certain that Galen could not have erred, maintained that the human frame had changed since the days of Galen. Even later than this it was considered unpardonable free-thinking to deny the medical principles of Galen, and the College of Physicians of London, in 1560, caused a practitioner to make a public recantation of some injurious remarks which he had made upon Galen. There is hardly a page of any mediæval work on medicine, whether Christian or Arabian, in which Galen is not quoted. On account of the immense influence which his writings exercised, and not because of their real value, I ought, perhaps, to give some notion of the state of knowledge revealed in his books. He considered anatomy his strong point, but it is doubtful whether he ever dissected a human body. It is certain that most of his observations, when they are minute, are true of the structure of pigs and apes. The sacrum, he says, has three parts, and the coccyx makes a fourth. The sternum is made up of seven distinct bones. He was the first man to describe the popliteal muscle and the platysma myoides. He describes accurately the sterno-hyoid and the thyro-hyoid. He gives a very good description of the muscles of the back and of the ligaments of the vertebral column, but he has two extraordinary errors. He says that the internal intercostals expand the chest, while the external retract it. He denies a muscular structure to the heart, and the reason is characteristic of his cardinal fault. A muscular structure, he says, is too simple a structure to be used for an organ with such complex functions. Veins originate in the liver, arteries in the heart. The aorta divides into two branches, one going up and the other going down. He was acquainted, however, with the ductus arteriosus, and knew it was open in the fœtus. In the nervous system he derived the nerves of sensation from the brain and those of motion from the cord, but he was of opinion that some nerves were sensory at their origin and motor at their extremities. The heart, he said, received no nerves, and was, therefore, insensible. He thought that the functions of the soul depended upon an alternate, inspiratory, and respiratory movement of ether engendered in the ventricles of the brain. He describes pretty clearly the corpora quadrigemina, the septum lucidum, and some of the cerebral nerves, but his account of the olfactory nerve is inaccurate. He failed to observe its branches, and thought that the cribriform plate of the ethmoid bone was a sieve, through which a humour formed by the brain passed into the nasal cavities. He gives a good account of the eye, apparently taken from the eye of a calf. His physiology was that the principal forces of the body are of three

kinds, vital, animal, and natural. The vital force originates in the heart, the animal in the brain, and the natural in the liver.

His pathology begins with assuming the state of health in the Hippocratic sense, and is, in fact, built up on the same principles throughout, with the introduction of a great number of new terms and infinite refinements and divisions due, not to an increase of observations, but to a subtle consideration of the possibilities of a definition. Galen always speaks of Hippocrates with such extraordinary respect that his posterity, to their injury, took the disciple to be a true reflection of the master, whereas, in fact, he was an admirer without understanding. The real king became a myth, and the mayor of the palace was absolute ruler of the medical world.

Celsus lived in the Augustan age, and wrote on medicine in a style not unworthy of his time. Some have thought that his medical treatise is the product of an author who collected what was known on medicine, but was not himself a physician; the latest, and I think the best opinion, is that he was a member of our profession. Many passages occur in which he expresses his own opinion—for example, in one place, talking of giving food, he says, "For these reasons I put it off till midnight." Again, speaking of a disease of the eye, he says, "I do not remember any instance of a person who was cured in this way." The books of Celsus treat largely of surgery, and whenever he deals with medicine he owes much to Hippocrates; I mention him after Galen, though he lived before him, for his writings have had much less influence, and are perhaps more deserving to be read as examples of good medical Latin than of profound medicine.

After the ancient authors the Arabians are usually spoken of as the revivers or continuers of medicine. Dr. Freind, who has, I believe, studied them more accurately than anyone else, has shown that the great body of their works are merely adaptations or enlargements of the Greeks. Further than this, it must be borne in mind that the Arabians and Jews were often imperfectly acquainted with Greek, and many medical errors were propagated for years owing to their mistranslations. There were several of the books of these Arabians in the library of the Doctor of Physik who rode to Canterbury.

"Wel knew he the olde Esculapius,  
And Deiscorides, and eek Rufus,  
Old Ypocras, Haly, and Galien,  
Serapyon, Razis, and Avycen,  
Averrois, Damascien, and Constantyn,  
Bernard and Gatesden, and Gilbertyn."

Rhazis, or properly Muhamad Ibn Zakariah, called Al Rhazis, wrote a book called the 'Continent,' and deserving the name for its size, which is written in a crabbed and involved style, but which from 900 A.D., when it was written, was esteemed a work of high authority, and continued to hold that position for many centuries. A new edition of one of his works formed the text-book of the faculty of medicine in one of the German universities so late as the middle of the seventeenth century. Rhazis practised in Bagdad, and died in 932 A.D., at the age of 80. The student who wishes to know what the Arabian physick was like cannot do better than examine a compendium of physick shorter than the 'Continent,' which Rhazis dedicated to Almanzor, lord of Khorassan. This work is divided into ten books, which all show distinct evidence of being founded on the works of Hippocrates, Galen, and three less known Greek writers, Oribasius, Paulus Ægineta, and Aetius. Rhazis, however, is original in some points: he is the first writer of a treatise on the diseases of children; he is the first author who describes the Guinea-worm, and the first to allude to caries of the bodies of the vertebræ; he is also the first to give an accurate description of smallpox, of which he distinguished the confluent and the discrete variety, and both from measles. In fact, Rhazis' description of the smallpox has been pronounced by competent judges to be the most favorable example of Arabian physick. Mesue, Serapyon, Isaac Ibn Sulaiman, Averrois, and Avicenna are quoted in every Latin medical book of the middle ages, and having been quoted so much more often than the information they contain deserves, may safely be left in peace upon the shelves. In the middle ages in Europe the physicians differed on such points as whether in this case or that you might bleed from the right or the left arm with the most advantage. Their writings have a remarkable sameness, and it is always exceedingly difficult to distinguish what they had compiled from what they originated. Whether you take Platearius, of Salernum, in Italy, or Bernard de Gordon, the famous teacher of Montpellier, or John of Gadesden, the physician of the English King Edward III, or Cormac Mac Duinnshleibhe, who taught and practised in the westernmost mountains of Europe, the style, the doctrine, even the very words, are singularly alike. But these writers, while they teach us but little of medical science, are not altogether despicable. They preserve a high tone about their professional duties, and if their practice of physick was a very imperfect one their idea of what the physician ought to be was exalted, and some of them show a modesty in

speaking of their own work, which may be studied in any age with advantage. The author of the 'Lily of Medicine'—for such fanciful titles do they often give to their books—says, "Because, therefore, the memory of man is untrustworthy, I do not blush to repeat to lowly men what is commonly said about practice. Since, according to Galen, in his seventh book, *de Ingenio*, no one can approach God better than by studying in truth and for truth."

The operations of Paré (1517—1590), who introduced the ligature of arteries, the anatomical studies of Vesalius (1542), who put together the first human skeleton, and showed that the ideas of Galen on human anatomy were erroneous, these advances made in the sixteenth century were the precursors of still greater progress in the next.

Harvey appeared, and his discovery of the circulation of the blood may be said to have founded the modern science of physiology. I have said that the Hippocratic medicine, astonishing as it was, was a science which existed with little or no help from the knowledge of structure and function in the human body. In the reign of King Charles II, a physician arose who restored the pure Hippocratic method of observing symptoms and drawing conclusions from them, rather than from preconceived hypotheses, thus giving medicine a fresh start. Many ancient institutions have what is called a second founder, thus, St. Catharine's College, a foundation dear to me, was founded by Dr. Robert Wodelarke, in 1473, while Dr. John Eachard, from the greatness of his own benefactions and of those which he persuaded others to make, is spoken of as its second founder. Gonville Hall, somewhat decayed in the reign of Queen Mary, was refounded to the great advantage of medicine by Dr. Caius. In the same way if Hippocrates be the first founder of the science of medicine, Sydenham may justly claim to be its second founder. With the powerful help of an accurate knowledge of anatomy, and of a rapidly increasing knowledge of physiology, the science has steadily advanced since his day. I shall first give a short account of the writings of Sydenham and then briefly enumerate the chief discoveries which have been made since his time.

A passage from Sydenham will at once explain what his method was, how he resembles Hippocrates and differs from all the Galenists.

"Nor can I tell how it should come to pass that he should be deceived who bounds and determines all his thoughts to the mere naked practice of the art or faculty which he designs to understand



fully, and to practise with reputation. Or, on the contrary, how is it possible that he should do anything but trifle away his whole life in deceiving himself as well as others, who is vainly employed in contriving those things that do not at all belong to practice. And as he would be no very honest or successful pilot that should not bend his mind so much to know and avoid the shallows and rocks, as to contemplate the cause of the ebbing and flowing of a sea, which truly becomes a philosopher, but is not his business, who is only to secure the ship : So neither will the physician, who has no other province than that of curing diseases, be a true proficient in the art of physic, though he has good natural parts, who does not take so much pains in searching out that hidden and crooked method, whereby nature produces and nourishes diseases (on which also their history depends), and in procuring agreeable remedies for them ; as in nice speculations, which do not at all conduce to the rescuing of men from the jaws of death, which physic promises. And this trifling humour does not only deprive mankind of those great advantages which would accrue to it by the ingenuity of very many, but it makes also that which is called the art of physic rather a babbling faculty. At length it comes to this, that the patient must live or die, as a philosopher guesses right or wrong."

A large part of Sydenham's works are occupied with accounts of the epidemics, which appeared every year in London in his time. His account of the gout, from which he suffered severely, is admirable. The commonest and most regular epidemic disease of his time was smallpox, and his treatise on the confluent smallpox is considered by Trousseau as one of the brightest titles to fame of this great observer. He was, I believe, the first to observe uræmic convulsions in scarlet fever, and the first to distinguish peri-pneumonia notha. Some traces of obsolete pathology do not prevent his works from being of the highest value at the present day, and no physician should leave them unread. I gave one passage as illustrating his medical system. I will conclude this account of him with another passage, which exemplifies his study and character.

"I am so made and disposed by nature, that what time others spend in reading books, I spend in meditation, and I do not so much inquire whether others are of my opinion as whether what I deliver be agreeable to truth : for I do not much esteem public applause ; and truly, what matter is it, if performing carefully the duty of a good citizen, and serving the public to my own prejudice, I have no thanks for my labour ? For if the thing be rightly weighed, the providing for esteem, I being now an old man, will be in a

short time the same, as to provide for that which is not: For what advantage will it be to me, after I am dead, that eight alphabetical elements, reduced into that order that will compose my name, shall be pronounced by those, who can no more frame an idea of me in their minds, than I can now conceive what those are to be, who will not know such as were dead in the foregoing age, and perhaps will have another language, and other manners, according to the inconstancy and vicissitude of all human affairs?"

Glisson, it is true, lived before Sydenham, but I feel that though his name is not sufficiently important to date an era, he ought not to be entirely neglected. He belonged to the same college at Cambridge as Harvey. It had been almost rebuilt by Dr. Caius, a physician, who may be said to have bestowed, material ornaments on our profession. The silver sceptre, which the President holds in his hand at meetings of the College of Physicians, was the gift of Dr. Caius, and at Cambridge his picturesque gates, still standing, are among the most beautiful specimens of early renaissance architecture in England. Over the one through which Dr. Caius wished students to enter is the word "*Humilitatis*;" that in the centre of the college bears the words "*Virtutis: Sapientiae*," while on the most beautiful of all, which faces the senate house, and through which the student must pass when proceeding to his degree, is carved "*Honoris*." The wishes of Dr. Caius have been fulfilled, and many famous physicians, following, I doubt not, the course quaintly indicated by these terse inscriptions, have passed out through the gate of honour. Glisson was the first to describe rickets, in a book which he published in 1650. His description is excellent and well worth reading, though it is a little obscured by seventeen chapters of obsolete pathology, and thirteen of treatment based on that pathology. Glisson was also an original investigator in anatomy, and it is from him that the fibrous investment of the liver takes its name.

Dr. Thomas Willis (M. B., 1646), a writer whose pathology and treatment are more like those of Glisson than of Sydenham, was also the first accurate describer of a disease and a discoverer in anatomy; the disease was saccharine diabetes, and his chief anatomical discovery was the anastomosis of arteries at the base of the brain, which bears his name.

Morton (M.D., 1670) cannot claim to have described any previously unknown disease, but the clinical value of his '*Phthisiologia*' and of his '*Pyretologia*,' is so great that he deserves mention in the history

of medicine ; he was, in fact, the chief continuator of the doctrine of Sydenham. His 'Phthisiologia' is an admirable account of the different forms of wasting. It is divided into three books ; in the first he describes general wasting under the heads of its cause, such as wasting due to hæmorrhage, to ulcers, to oversuckling, to diarrhœa, to diabetes, to salivation, to dropsy, and to great sweats. In his second and third books he treats of the causes, nature, and treatment of pulmonary phthisis, which he regards, as he does general wasting, from the point of origin ; for example, as it begins with hæmoptysis, with chlorosis, or with pneumonia. His 'Pyretologia' is an excellent treatise on fevers : delightfully firm ground to any one who has waded through the sloughs of the Galenic books *de Febris*.

Sir George Baker investigated the results and occasions of lead poisoning, and proved that the colic of Poitou was due to it. His essays (1767) on the subject are models of medical investigation.

Two great men, of whom the former did not receive his due in his own day, while the latter flourished in all the sunshine of imperial favour, lived in Vienna in the latter half of the last century—Auenbrugger and De Haen. Auenbrugger discovered percussion as a method of diagnosis of disease of the lungs (1761), and De Haen was the first to make clinical use of the thermometer (1758).

Heberden (M.D., 1739), like Morton, deserves mention on account of the extreme value of all he wrote—a value which is above the alterations of time. His commentaries on diseases are the results of his own observations of half a century. They are entirely original, but the only disease described by him for the first time is angina pectoris. Sydenham, Morton, and Heberden are, perhaps, the three greatest physicians of England. Certainly no better examples could be mentioned of the method of study in medicine which has always been prevalent in this country. Chemistry had, become a science in Heberden's days of practice, and while he was growing old two other sciences, destined to have a powerful influence on medicine, were advancing rapidly. An accurate study of human anatomy had been succeeded by the commencement of precise observations of diseased structures, but these had been few and slight till Morgagni, Professor of Medicine in the University of Padua, published in 1762 the first treatise of value on 'Morbid Anatomy.' The study which Morgagni instituted was greatly advanced by Dr. Matthew Baillie's terse and lucid book, which appeared in 1796.

The other science had begun in the practice of inoculation, but made no real advance till its greatest achievement was accomplished

when Edward Jenner, in 1796, first successfully performed vaccination. He proved its protective power against smallpox, and by his discovery established the science of hygiene or of the prevention of disease.

The next advance was a very great one, and by it a vast field of the wild land of conjecture was brought within the cultured domain of knowledge. Laennec, a few of whose pupils still survive, introduced in 1818 the practice of auscultation. The several degrees and stages of pleurisy, of pneumonia, of phthisis, of pulmonary catarrh, pneumothorax, œdema of the lungs, and emphysema, were distinguished and determined in his '*Traité de l'Auscultation*,' published in 1819. Examine any book on medicine before his time, and you will find that the department of the diseases of the chest is most defective in the matter of diagnosis. Baglivi, writing in 1696, expresses the feeling of all physicians before the year 1818 in the words, "*O quam difficile est morbos thoracis cognoscere*," and a study of old recorded cases reveals the utmost confusion as to the lesion present. Laennec did not apply his new art to the study of cardiac disease, but to him is due the fact that every practitioner now knows how to investigate the nature of thoracic affections. His name marks an epoch in medicine.

The next great discovery was made in England, when Bright demonstrated that one large class of dropsies was due to disease of the kidney.

The discovery of Sir Charles Bell, the second great achievement of physiology, of the functions of the nerves, was the first step of a brilliant series of discoveries in diseases of the nervous system. England has not been behindhand, but the name of Duchenne must claim the chief honour, and his position with regard to the diseases of the nervous system is almost as great as that of Laennec in diseases of the chest. It will be seen that the French and the English have been the greatest discoverers in medicine, and the lines of Dryden, which refer to science in general, are especially applicable to medicine.

"Among the assertors of free reason's claim

Our nation's not the least in worth or fame."

I believe I have not over-estimated the share which the English have had in the development of medicine. The discovery of Auenbrugger as to percussion, and the mechanical inventions of the laryngoscope and ophthalmoscope, have been the chief contributions of Germany. De Haen was a Dutchman, and Tulpus, of whom



Rembrandt has left so noble a memorial in the picture of the anatomical lecture now in the gallery at the Hague, is a physician whose medical works are worth reading, though his chief additions to science were anatomical. Boerhaave will be remembered as long as the University of Leyden flourishes. A Dutchman, Leeuwenhoek, and an Italian, Malpighi, were the founders of the study of microscopic anatomy, and it has been by contributions to morbid anatomy, to anatomy, and to physiology, that Italy has most aided the advance of medical science. Ireland and Scotland have had some of the greatest clinical teachers. Spain perhaps comes last, but it ought to be remembered that the University of Salamanca, by its enlightened decision in favour of the lawfulness of the dissection of human bodies, enabled Vesalius to continue his investigations, and cleared the way for further discovery.

I have tried in this letter to give you a sketch of the advance of medicine rather than of its successive schools and phases. The list of real discoverers in every science is rather a short one, much shorter than that of the well-known names. This is especially true of medicine, which has been of necessity publicly taught and studied by many men in every century. Many of its teachers have owed their fame, not to the newness or peculiar value of what they taught, but to their admirable method of teaching and arrangement.

Boerhaave and Cullen, in my opinion, are examples of fame due to this cause, and the same may be said of many other writers, whose names deserve a place in a biographical dictionary of physicians or of distinguished men, but not in an account of the direct progress of medicine.

Hippocrates, Sydenham, Laennec, Edward Jenner, in the first rank; with Glisson, Willis, Morton, De Haen, Auenbrugger, Heberden, Bright, Duchenne, and some few others, in the second rank; these are the names never to be forgotten when physicians follow the wholesome exhortation of the wise man, perhaps himself a physician:

“Let us now praise famous men and our fathers that begat us.”

Wishing your book success,

I remain, dear Dr. KNOXY,

Yours sincerely,

NORMAN MOORE.

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